THE ENGINEERING AND MINING JOURNAL

COAL

Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. XLIX. MAY 24. No. 21.

RICHARD P. ROTHWELL, C.E, M.E., Editor.

ROSSITER W. RAYMOND, Ph.D., M.E. Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition

London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.

Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.

Peru, S. A.: Mr. John Newton, No. 2 Calle Constitucion, Calla.

Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:

Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.

Monthly Export Edition, all countries, $2.50 gold value per annum.

REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING CO., Publishers,

SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.

P.O. Box 1833. 27 Park Place, New York.

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ERRATUM.—In the review last week of the Iron Silver Decision, page 557, line 26 from the top, for "the junior patent affords in itself no proof that the proceeding by which it was obtained was wholly *ex parte*," read "was *not* wholly *ex parte*." This clerical error was, doubtless, corrected by most of our readers, but it may have been unnoticed by others, and so important and valuable a document calls for this correction.

"DAMARIUM" is the name proposed for a supposed new gaseous element claimed to have been recently discovered in South Africa, an account of which has been published in the *Chemiker Zeitung*, April 2. There have been so many false alarms lately in the line of supposed new elements that the report will not receive general credence, notwithstanding the very circumstantial account of the analysis, until supported by the tests of further investigation. But if it should prove to be true, "damarium" would bring about a complete change in chemical notation and theory, since its specific gravity, as reported, has been determined as 0.5, or one-half that of hydrogen, and if such is the case it would have to be taken as the true unit in the system of atomic weights. Interesting, if true.

THE rate at which steel is supplanting iron in shipbuilding is shown by the following statistics for Great Britain, given in *Lloyd's Register*: In 1878, when steel was first introduced on a commercial scale for this purpose, only seven steel vessels were launched, with a total tonnage of 4,470 tons, against 435 iron ships of 517,692 tons. Last year there were 690 steel vessels, of 1,209,361 tons, and only 102 iron ones of 72,975 tons. The reversal is overwhelming, but is only in line with the corresponding practically complete change from iron to steel rails and the rapid substitution of steel for iron in bridges and roofs, and is in accord with the general tendency of the times. The rapidity of this substitution of one material for another is even more striking than its completeness.

THE McKinley Tariff Bill has passed the House, for the most part without any discussion, though its provisions vitally affect many great industries. The Senate still has to act on it, and may or may not amend or pass it. In the meantime, it is absolutely certain that even the partial exclusion of Mexican silver-lead ores is not only injuring our home smelting, railroad, and especially silver ore mining interests, but the retaliatory duties imposed on American products going into Mexico is injuring the farmers and manufacturers who exported to that country. The prompt effect of the enactment of the McKinley tariff will be the building up of a great metallurgical industry in Mexico, largely with American capital, and we can then let the Mexicans get the profit of treating ours as well as their own ores.

INTERNATIONAL COPYRIGHT.

Although the International Copyright bill received a temporary setback in the House three weeks ago, when it failed (by an indecisive vote) to pass to a third reading, it is likely to be called up again under the rules at any time during the session. We trust that the friends of the bill in Congress will not relax their efforts now that the passage of the measure has been so nearly reached. They have the hearty support of an overwhelming majority of the disinterested thinking men of the country who are neither authors, publishers, nor otherwise concerned, than so far as all good citizens should be anxious for wise, not to say honest, legislation. The handful of dishonest publishers who steal foreign books have made it appear to some of the opponents of the bill that the majority of the people think otherwise. If these members will look at the position of the press of the country, the best means of judging of the wishes of the people, they will think differently. The people who are capable of forming a judgment on the matter have made their voice heard.

It is too late now for further argument. All the points have been presented *pro* and *con*. The only one against the bill worth debating—that its passage would make dearer books—that is, of recent and future English novels, to put it in brief—has been disposed of. But, after all, that is not the question. Nor is it one of free trade and protection, of sentiment, or the claims of interested persons. It is a question of simple honesty and decency, and no American wishes his country to be branded and to merit the epithet of dishonest. Let Congress pass the copyright law and stop literary theft.

SCHOOLS OF FINANCE AND ECONOMY.

In the year 1881 there was established, through an endowment of $100,000 by Mr. JOSEPH WHARTON, the Wharton School of Finance and Economy of the University of Pennsylvania. This school, begun as an experiment, was at first but moderately successful, but by steady perseverance in its task it has developed to such an extent that it is now chosen by many earnest students, and has taken a high rank among the departments of the University. Last year Mr. WHARTON made a further endowment of $25,000 to found a library fund.

At a meeting of the Executive Committee of the American Bankers' Association, in New York City, October 16th, 1889, a committee was appointed to secure the preparation of a paper to be read at the next convention of the association on the establishment of schools in connection with the universities and colleges of the country, of general scope and character like that of the Wharton school, and on the best means by which such schools may be fostered by the association. The committee have requested EDMUND J. JAMES, Ph. D., Professor of Public Finance and Administration in the Wharton School, to prepare such a paper, and they have issued a pamphlet to bankers and others interested in the subject, describing the work and intentions of the Wharton School, for the purpose of eliciting suggestions and expressions of opinion from those to whom it is sent, which suggestions will be considered by the committee in determining what recommendations they shall make to the executive council for further action by the association. They request that such suggestions and comments be sent to their chairman, WILLIAM H. RHAWN, President of the National Bank of the Republic, Philadelphia.

No better expression of the reason for the existence of schools of finance and economy can be found found than that given by Mr. Wharton in his letter written in 1881 to the trustees of the University of Pennsylvania, concerning the indorsement which he then offered. He says:

"The general conviction that college education did little toward fitting for the actual duties of life any but those who purposed to become law-

vers, doctors or clergymen, brought about the creation of many excellent technical and scientific schools, whose work is enriching the country with a host of cultivated minds prepared to overcome all sorts of difficulties in the world of matter. Those schools, while not replacing the outgrown system of apprenticeship, accomplish a work quite beyond anything that system was capable of.

"It is obvious that training in a commercial house not of the first rank for magnitude and intelligence must, like trade apprenticeship, often result in narrowness and empiricism. Systematic instruction cannot be expected from the overworked heads of any great establishment; the novice mostly depends on what he can gather from the salaried employés of the house, and instead of being instructed in the various branches, is, probably, kept working at some particular function for which he has shown aptitude, or where his service is most needed.

"There is, furthermore, an increasing number of young men possessing by inheritance wealth, keenness of intellect, and latent power of command or organization, to whom the channels of commercial education, such as it is, are, by the very felicity of their circumstances, partly closed, for when they leave college, at the age of twenty to twenty-five years, they are already too old to be desirable beginners in a counting-house, or to descend readily to its drudgery.

"No country can afford to have this inherited wealth and capacity wasted for want of that fundamental knowledge which would enable the possessors to employ them with advantage to themselves and to the community. Nor can any country long afford to have its laws made and its government administered by men who lack such training as would suffice to rid their minds of fallacies, and qualify them for the solution of the social problems incident to our civilization.

"It is reasonable to expect that adequate education in the principles underlying successful business management and civil government would greatly aid in producing a class of men likely to become most useful members of society, whether in private or in public life. An opportunity for good seems here to exist similar to that so largely availed of by the technical and scientific schools."

The great need for special higher education in finance and economy, which the colleges of the present day make practically no attempt to fill, has been shown in the letter of Mr. ANDREW CARNEGIE, to which we referred some weeks ago. He has failed to find the college-bred man at the head of great business houses, but does find that the prize-takers are those who began as office boys early in their teens. The reason is, not that the office boy is naturally superior in intellect or in administrative ability to the collegian, but that the latter is handicapped in the race for commercial success by the fact that he does not receive in his college course any of that kind of business education which the office boy gets, and which is essential to success. In industrial pursuits, also, the regular college graduate is not apt to take a high place, but he is beaten by two entirely different classes of men; first, those who began their practical training as apprentices in the workshop, and secondly—a growing class, who are rapidly distancing the first—those who graduate from the technical schools. In commercial life we have the class which ranks with the mechanical apprentice—the office-boy class. But we have no class which corresponds to the technical graduate, and it is this lack which schools of finance and economy, like the Wharton, are intended to supply. As Mr. CARNEGIE shows, the graduates of the technical schools are rapidly reaching the higher positions in the industrial world, and those who begin as apprentices are now reaching only the secondary positions, while the collegians are nowhere; so it may be expected that graduates of a thorough technical school in finance would outrun the office-boy class.

There is, however, a far higher reason for the establishment of these schools of finance and economy than the opportunity they will offer to individual students for entrance to a successful business career. It is that such schools may train a class of men for public affairs, of which the country to-day more than ever before stands greatly in need. It may matter little to the country at large whether a successful merchant reaches his success through the training he got as office boy or as student in a special school; but it is of great importance that those who direct the policy of the government shall be broadly educated and thoroughly intelligent men. Politics or the science of government is rapidly becoming a science of economy and finance, rather than a system of police. The most important questions before our government, as well as before other governments, are those of revenue, taxation, commerce, statistics, currency, administration of the public wealth, tariffs, bounties, subsidies, public improvements, the management and discipline of an army of office-holders, most of whom have the handling of public moneys. The proper dealing with these vast subjects, both in legislation and in administration, requires a set of men not only of absolute integrity, but of the highest intellectual and administrative capacity. The best men the country produces in any of the diversified occupations, industrial, commercial or professional, are none too good or too able for the management of public affairs. Yet in the selection of men for these affairs, there is more hap-hazard and lack of system than in any department of private enterprise. We are taking no steps to train men to be legislators or administrators of public affairs. Civil service we have to some extent, but at its best this is only a sort of apprenticeship or office-boy system. It does not lead to the development of the highest intelligence and broadest minds in the office-holders.

There is here a field for the schools of finance and economy to train a portion of the rising generation so that if they should be called into public office they enter it well grounded in the principles of governmental finance.

We trust that there will be an earnest response to the circular of the Bankers' Committee, and that it will lead to a thorough discussion and to action at their next convention.

"DISCOUNTS FOR EXPORT ONLY."

In the House of Representatives, on the 20th inst., in the discussion of the Tariff Bill, Mr. MANSUR, of Missouri, brought up the question of our manufacturers selling their goods for export cheaper than they do to the home trade, and he cited the Export Price List, issued every month with the ENGINEERING AND MINING JOURNAL, in proof of the truth of his statement. Mr. MANSUR, knowing the standing of this journal, naturally felt assured that the statements and figures published in our pages are absolutely correct and can be relied on; but Congressman Smyser, of Ohio, with whose views these facts clashed, replied, quoting the *Cleveland Leader*, to the effect that American manufactures make lower discounts to the home trade than to the foreign, a statement which is so easily disproved that the *Cleveland Leader* cannot be ignorant of the fact.

We recently received a letter from the head of the chief protection organization in this country asking in the most naïve manner whether it is actually true that greater discounts are given to the export trade than to our home buyers; and, if so, the reasons why? It would seem, therefore, that among the ultra protectionists there is a large and convenient amount of ignorance on a subject which we had supposed was so well known as to call for no special comment, and which in fact is so well known that the regular monthly publication of the fact, and of the *actual* export prices of our manufacturers, as given in the ENGINEERING AND MINING JOURNAL, have never been questioned or controverted, though we have had frequent letters from some manufacturers objecting to our letting the home trade know the prices and discounts at which they sell "for export only."

The Price Lists "For export only," published in the ENGINEERING AND MINING JOURNAL, are *not* advertisements; they are published by us with the object of promoting our export trade, and generally against the wishes of jobbers, who are thus prevented from adding an extravagant commission on manufacturers' prices, thereby injuring the manufacturer and the export market.

It is not necessary to say to the "constant readers" of the ENGINEERING AND MINING JOURNAL that the utmost care is taken to secure absolute accuracy in these trade quotations, and that neither personal interest nor political exigencies are allowed to influence in any degree the full statement of the actual facts. If these, which are all in favor of the gradual reduction of our outrageous war tariff, happen now to bear heavily on one political party, the fault is not with us; for we take no side in party politics, and look upon the question of increasing the taxes of the people as a purely economic and industrial one.

In order to confirm the confidence which Mr. MANSUR has shown in our statements, on receipt of the *Congressional Record* of 21st inst., containing the report of these speeches, we had a few of the most important manufacturing concerns, with offices in this city, interviewed, and we give here briefly the substance of what they say. The names are withheld, though we forward them to Mr. MANSUR for his satisfaction. They are all firms of high standing, the largest concerns of their classes, and their statements are easily verified.

The manager of a very prominent iron works said:

"We manufacture exclusively engines and boilers; we, of course, make a discount for export. As an illustration: The 20 horse power engine on the first page of our catalogue is listed at $700. Our lowest price for same to dealers or wholesale houses of any kind in this country is $525 net; our export price for the engine is $495 net. Our exp. rt discount ranges from 2½ to 7½ per cent. better than the home trade, according to the size of the engine."

One of the very largest exporting firms, who manufacture silver-plated ware, say:

"We allow an export discount of 60, 10 and 5 from our list. The best home discount we ever give is 50, 10 and 10 per cent. This, however, is only on large orders."

Another of our large silver plate manufacturers, who does a very large export business, says:

"Our export discount is 50, 10 and 5 per cent. Our home discount is 50 per cent. We sometimes allow an extra 5 per cent., but only with a few firms."

A slate manufacturing concern, doing a very large business, says:

"Of course, we have special export discounts (See 'Export Discounts' stamped on outside of our catalogue)."

The catalogue shows these "export discounts" to be from 33⅓ to 50 per cent. and on large lots 5 per cent. more.

One of the largest cutlery companies in the country, doing a good export business, says:

"We, of course, make a considerable difference in the discounts on export tra We object, however, to giving you our home discounts, as they fluctuate."

The export discounts in this case are 4 per cent. greater than those to the home trade, and the firm writes, "Prices are for export only."

A large fancy hardware house says:

"Certainly we make a difference on export trade. Our discounts, however, fluctuate so much that we will have to make a list out for you."

A very important hardware house answers:

"Lowest price at which we sell goods, Class A or net, we allow for export a discount of 10 per cent.; upon all other goods we allow 33⅓ per cent. for export and 25 per cent. to large home dealers."

One of the largest exporting manufacturers of paints and varnishes makes the following very important statement: we may say that the heads of this concern are, or were at the time of the last Presidential election, very strong Republicans and Protectionists. Their political and politico-economical views appear to have been very greatly modified by the practical working of the trust protection policy now in force, and by the threatened increase in the tariff.

"We used to make a discount for export higher than for the home trade, but the trusts have completely destroyed the export trade in paints and varnishes. To give an idea of the injury trusts have done us, you will readily see. Linseed oil to-day is selling in England at 34 cents per gallon; we are paying 62 cents per gallon to the trust. This is a difference of 80 per cent. in favor of the English manufacturer. White lead is selling in England at 4 cents per pound; we are paying 6½ net, making a difference of 60 per cent. against us. We cannot buy our oil in England, as there is a tariff of 25 cents per gallon on oil; thus with freight, insurance and other charges, it brings the price of oil the slightest fraction over the price charged by the trust. They are now talking of raising the tariff on linseed oil. This will enable the trust to again raise their price on it. As an illustration of the injury this trade is receiving, we can assure you that if the McKinley Bill were to pass, and could be guaranteed to us for ten years, we could make thousands of dollars each year by removing our plant to England, manufacturing there, and importing the goods; indeed, at the present time there are many articles that we can buy, paying all charges of importation, and put into our showrooms at less money than we can manufacture. This is particularly true in the case of chrome yellow and other preparations in which white lead and linseed oil are ingredients. Before the formation of the lead and linseed oil trusts we were exporting these goods."

A manufacturer's agent, exporting agricultural tools, handles, etc., says:

"The difference between home and export discounts in this line ranges from 7½ to 15 per cent."

A watch manufacturing company says:

"The difference between home and the export price is about 15 per cent." This company threatened to withdraw their advertisment from the ENGINEERING AND MINING JOURNAL because we quote their export discount in papers that circulate in the United States.

A tool company which makes picks, hammers, etc.,

Refuse absolutely to give the ENGINEERING AND MINING JOURNAL an advertisement as long as it continues to publish their export discounts.

The agent for a blower manufacturer says they

Give a discount on all of their goods of 10 and 5 per cent. for export, whereas they only give 10 per cent. for home trade.

A company manufacturing water motors, hammers, etc., makes the following discounts:

On water motors, allow 40 per cent. for export, 30 per cent. for home trade; on hammers, 40 per cent. for export and 20 per cent. for home trade; slater's tools, they give 30 and 35 per cent. for export, only 20 per cent. for home trade.

A manufacturer of packing writes us: "The very bottom *home* price on ——— packing is 40 cents net per pound, and the best for export 38 cents; the list in both cases being 75 cents per pound."

These examples could be multiplied indefinitely, and are merely cited in confirmation of what "every one knows," that our manufacturers sell goods "for export" cheaper than to the home trade. The fact is indisputable.

It would be unfair to say that our manufacturers should never make any difference between export and home prices, for it is evident they could afford to sell a surplus for export, even without profit, if they could get from the home market a living price, and by increasing production, which the foreign sales would permit, would reduce cost of output. The home consumer is then interested in our manufacturers having a foreign outlet for their goods. It is equally evident that the exorbitant tariff protects the "trusts." The great paint firm whose opinions are given above finds by experience that the trusts which manufacture linseed oil and white lead are so well protected by the present tariff, which the MCKINLEY bill proposes to largely increase, that they are making the manufacture of secondary products, and an export trade in them is absolutely impossible.

Will it be surprising if the people of this country who are imposed upon by tariff-protected trusts, and who are taxed so enormously through the operations of a war tariff, some day arise and sweep the whole protective policy away without considering the incalculable injury that this sudden change of conditions will bring upon many important industries?

The "free traders" are no longer concealing their satisfaction with an administration of the protective policy which they rightly foresee will bring about a great revulsion against the system. It would indeed seem that those who are now managing the protective policy are wholly regardless of the ultimate consequences of their work, but are intent only on repaying, at the expense of the people, obligations incurred to special interests. This policy is doing great injury to the country, and, if persisted in, will bring still greater harm in the not distant future.

The Thorneburry Safety Lamp.—All the scientific reports that have been made of the Thorneburry miners' lamp concur in pronouncing it a practically important invention. It is said to be self-extinguishing in a mixture of fire-damp and air, and to give instantaneous warning of any dangerous condition in the atmosphere of the mine. Sir Frederick Abel, Mr. C. E. Rhodes, Sir Warington Smyth, F. R. S., and Mr. Thomas Burt, M. P., speak in the highest terms of it.

NEW PUBLICATIONS.

THE MODERN LAW OF RAILWAYS. By CHARLES FISK BEACH, JR. Published by the Bancroft-Whitney Company, San Francisco, 1890. Sheep, 16-mo., 2 vols., 1,544 pp. Price $6.

This is a very compact digest of railway law, conveniently arranged and with numerous citations. The work is based on the interpretation given by the courts and statutes of the United States and England. There are many other treatises on the subject; this one has the advantage of newness—for example, in discussing the questions which have come up under the interstate commerce law of 1887. The author presents what he terms the "perspective" of railway law, giving prominence to novel and live phases of the subject, and also endeavors to bring out more fully such branches as have been inadequately treated elsewhere.

THE PHYSICAL PROPERTIES OF GASES. (Vol. II., Riverside Science Series.) By ARTHUR L. KIMBALL, of Johns Hopkins University, Baltimore. Published by Houghton, Mifflin & Co., Boston and New York, 1890. Cloth. 16mo., 238 pp.; 39 figs. Contents and list of cuts; no index. Price, $1.25.

Mr. Kimball has chosen a very difficult subject for treatment in a book of this size and class. The difficulty lies in the necessity of conveying some insight into the whole range of physics and chemistry, and it is hard to condense this fairly. The book is not to be classed among the "popular" ones, and is by no means elementary. The author has adopted a middle ground between the "popular" mode of treatment and the method of the most advanced treatises. There are only one or two algebraic formulæ in the whole book; but the author cannot avoid putting his illustrations in a quantitative way, and close attention is needed to read understandingly the many numerical examples by which he fortifies his line of argument. Throughout the book a desire is manifested to state the conclusions reached in an honest, impartial manner. Possibly even greater reservation is demanded in some instances.

The work attacks some of the most profound questions of modern science, about which the most eminent physicists are undecided. When it comes to the discussion of the ultimate constitution of matter, it is inevitable that the current speculations should be cited; but they cannot be stated too guardedly, in view of the certain revision which the progress of the future will apply to some of them. The historical method of developing the subject is excellent, names of discoverers and usually the dates of discovery being given.

BOOKS RECEIVED

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

Irrigation in Egypt. By J. Barois, Engineer in Chief des Ponts et Chaussées. 1887. Translated by Major A. M. Miller, Corps of Engineers, U. S. Army, 1888. Published by the U. S. Government, Washington, D. C., 1889. Pages, 111. Illustrated.

Railroad Engineers' Field-Book. By H. C. Godwin. Published by John Wiley & Son. New York. 1890. Pages 358, illustrated. Price $2.50.

Recent Economic Changes. By David A. Wells, LL.D., D.C.L. Published by D. Appleton & Co. 1890. New York. Pages 478.

Reflections on the Motive Power of Heat and on the Machines Fitted to Develop that Power. From the original French of N. L. S. Carnot, Graduate of the Polytechnic School. Edited by R. H. Thurston, M. A., L.L.D., Dr. Eng'g. Published by John Wiley & Son, New York. 1890. Pages, 358. Illustrated. Price, $2.50.

Reports of the Inspector of Mines for six months ending November 30th, 1889. Second revised edition May 10th, 1890, with an Appendix on Placer Mining. Published by the Journal Publishing Company, Helena, Mont. 1890. Pages, 129.

Statistics of the American and Foreign Iron Trade for 1889. Published May 1, 1890. By James M. Swank, General Manager of the American Iron and Steel Association. Published by the Association, Philadelphia, Pa. Pages 112. Price $3.00.

The Modern Law of Railways. Vols. I and II. By Charles Fisk Beach, Jr. Published by the Bancroft-Whitney Company, San Francisco, Cal., 1890. Pages 1,544. Price $6.00.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Graphite Deposits in Mexico

EDITORS ENGINEERING AND MINING JOURNAL:

SIR: I am informed that there are several graphite deposits in Mexico, and I am desirous of communicating with parties interested in the same, with the view of investing capital. Will some of your readers please reply to this. Yours truly,

GRAPHITE.

New York, May 22.

Automatic Valves on Lead Furnaces.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have just been reading the issue of your paper in which Dr. Peters gives an account of his trip West. I notice he specially mentions, as something new, that at the Montana Smelting Works he saw an automatic valve on the tuyères of a lead-furnace, for preventing the furnace-gases from getting back into the blast-main when the blast is stopped. I do not recollect having seen any automatic safety arrangement of this sort in use in any lead works in Europe, but I was myself brought, very early in my professional experience, to adopt one. I had the advantage of "assisting" (in the French sense) at the complete wrecking of a long blast-main and a blower, owing to explosion of gas during a stoppage of the engines for a little while. Since then I have erected many furnaces, all fitted with a safety arrangement. I use a balanced quadrant valve in the main branch to the furnace, just before it connects to the wind-ring round the furnace. The moment wind is taken off the furnace this valve drops so as to close the way back into the main, and at the same time open an escape into the air at top of pipe. When wind comes in again it lifts the valve, and closes the escape.

If one could have an automatic workman who would close the main throttle-valve in his branch as soon as blast stopped, nothing more would be needed, but generally he does nothing of the kind.

I gather from Dr. Peters' letter that each tuyère was fitted with a valve, which seems rather luxurious!

I supposed you wide-awake people over there would have automatic valves on your furnaces long ago, and I only infer the contrary from Dr. Peters' letter.

By the way, when is some Peters of the *lead* works going to do for that branch of modern American practice what the coppery Peters has done, and done so splendidly for his branch? That is the sort of book we want to see, not the eternal handbook by the eternal professor who simply writes what all his predecessors wrote, or what he is *told* at works and digests more or less,—mostly less. Yours truly, W. M. HUTCHINGS.

NEWCASTLE-ON-TYNE, May 10, 1890.

SOCIETIES.

OHIO INSTITUTE OF MINING ENGINEERS.

The announcement is made that the Summer Meeting of the Ohio Institute of Mining Engineers, will be held at Massillon, O., on the 11th, 12th and 13th days of June. The meeting promises to be one that no member, or any one interested in the development of the mineral or manufacturing industries of Ohio—it is stated—can afford to miss.

The regular programme will be issued on June 1st. In response to requests for papers, sent out February 15th, 1890, the following members promised papers on the subjects opposite their names:

Hon. Anthony Howells, Massillon, President's Address. Prof. Edward Orton, Columbus, subject to be announced. R. S. Weitzel, Weatherford, Tex., "The Coal Fields of Texas." Thomas H. Love, Dist. Mine Insp., Leesville, "The Oils Burned in Our Mines." Hon. Andrew Roy, Glen Roy, "Certificated Mine Inspectors." William Job, Nelsonville, "Use of Electricity in Mines at Brush Fork." Robert Bell, Dist. Mine Insp., Massillon, "Safety Catches and their Dangers." E. B. Willard, Hanging Rock, "The Manufacture of Pig Iron at Hanging Rock." Capt. J. L. Morris, Coshocton, "Black Band Ore Fields at Post Boy, Tuscarawas County." T. S. Watkins, Zaleski, "The Coals of Vinton County." William R. Kimball, Western Agent, Thomson-Houston Motor Company, Cincinnati, "Various Systems of Electricity." B. Wheeler, Zanesville, subject to be announced. Prof. F. W. Sperr, O. S. Univ., Columbus, "Mine Ventilation." T. F. Smith, Mineral Point, subject to be announced. Prof. N. W. Lord, O. S. Univ., Columbus, "Blast Furnace Tar and Ammonia." William M. Schlesinger, Electrical Engineer, Columbus, "The Application of Electricity in Mines." R. M. Hazeltine, Columbus, will exhibit the mode of operating the Shaw machine for the detection of poisonous gases in mines.

TENTH ANNUAL MEETING OF THE AMERICAN WATER-WORKS ASSOCIATION.

The tenth annual convention of this association opened on Tuesday, May 20th, in the parlors of the Grand Pacific Hotel, Chicago. The convention was called to order in the morning, when the regular order of business was transacted and the usual reports presented. In the absence of Mayor Cregier, Comptroller Onahan delivered a hearty address of welcome to the members on behalf of the city.

In the afternoon the reading of papers began. Mr. C. N. Priddy, of Leadville, Colo., presented one on The Laying and Maintenance of Mains, Hydrants and Service Pipes where Frost Goes Deeper than They are Laid. The author gave a detailed description of the methods employed at Leadville for protecting the pipes, etc., by non-conducting packing, method of boxing, and the use of a portable thawing apparatus, consisting of a four horse power boiler mounted on a wagon.

Mr. J. P. Donahue's paper on A Simplified Method of Bookkeeping for Water Departments reviews the set of forms usually printed and the books made up from them, and shows how, by combinations, simplicity may be obtained, pointing out also the desirability of so systematizing details as to secure a more uniform method for different water-works offices. The keeping of a special book for the classification of receipts and expenditures, as is now sometimes done, is recommended, while the difficulties of formulating such a book, as well as the engineers' reports are recognized.

The reading of papers was continued on Wednesday and Thursday, and some very practical contributions were offered. The paper of Mr. Edwin Darling, Superintendent of the Pawtucket Water Works, called attention to the desirability of increasing the number of fire hydrants where the size of mains and the supply warrant, and showed the great efficiency and permanency of hydrants above hose, and also that in most cities a false economy in first expenditure has too much limited the number. Mr. J. Nelson Tubbs presented an analytical memoir on the basis on which schedules of water rates should be determined, in which the critical data of compound interest, repairs, operating expenses, extensions, depreciation, fixed rents, etc., should be treated to ascertain the balance to be made up yearly from water rates.

Other papers on the programme were on the Contamination of Storage Water on the Pacific Coast, and the Palliatives Resorted to, by Mr. L. J. Le Conte; Work Accomplished by the A. W. W. A. in the Past Ten Years, by Mr. P. H. Lindgren; Measurements of Drainage Basins and Flows, by Mr. S. McElroy; Cost of Pumping Machinery and Boilers, by Mr. C. A. Hague; Water Supplies, by Mr. C. Monjeau; Water Works Securities, by Mr. Wm. Reinecke; Taxation of Private Water Companies, by Mr. A. N. Denman; Waste of the Mississippi River, by Mr. Wm. Molis: Experience with Artesian Wells, by J. T. Lakin; Water Works Construction, by Mr. F. L. Fuller, etc.

During the meeting of the convention a very interesting exhibit of electric light apparatus was given in the same hotel by the local agents of the Thomson-Houston Company, who also assisted in entertaining the visitors. The final business meeting was held Thursday, May 22, and a banquet was given in the evening.

Railroad Car Anti-dust Ventilator.—A new method for ventilating railway carriages and preventing dust from entering with the air has lately appeared in France. The more quickly the train moves the more rapidly the apparatus works. The air is made to traverse a receptacle containing water, which cools it and relieves it of dust, after which it goes through another filtering before entering the carriage.

DIRECT ACTING HYDRAULIC PUMPING ENGINE.

We illustrate herewith a type of direct acting pump which is designed to be driven by water pressure having "heads" from 300 feet to 500 feet, or even 1,000 feet. The pump has been designed and constructed by Messrs. Knight & Co., engineers, Sutter Creek, Amador County, California, and the credit of its gradual evolution is mostly due to Mr. Samuel Knight, who has devoted many years to the application of high-pressure wate power to mining operations.

The main cylinder is 12 inches diameter, and is of wrought iron, and the side pipes are steel castings. The principal feature, and the one that finally led to noiseless and successful working, is the use of independent exhaust valves. The induction valves are moved by the auxiliary cylinder shown on the top. The working of the machines is quite noiseless, and there is not the least jar even when 500 feet of heavy pump rod is connected with the engine. Four of these large pumping engines are now working with driving "heads" as follows: one with 336 feet, two with 460 feet, and one with 720 feet. The efficiency of the engines has been carefully tested, and is found to be 75 per cent. The firm guarantees this efficiency for all engines when the diameter of the main cylinders is 12 inches or more.

The illustrations which, with this description, we take from our valued contemporary, London *Industries*, show the details of one of these pumping engines constructed for the Plumas Eureka mine in California, to operate under a head of 720 feet, *i. e.*, with a pressure of 310 pounds per inch. *A* is the main cylinder, *B B* induction pipes, the water entering at *C*. In the two boxes *D D* are two plain slide valves actuated by the auxiliary hydraulic cylinder *E*. This cylinder *E* is controlled by a small slide valve in the box *F*, which is operated by the sliding tappet *G* and the rod *H*. The stop collars *I* on *H* are moved by the bracket *J*, which is mounted on the cross-head at *K*. The tappet *G*, shown in the plan, is one of the "pass through" type, and acts some time in advance of the main valves. The exhaust pipes *L L* extend from the valve boxes *D D* down to two balanced cylindrical valves at *M*, which control the exhaust flow as it passes to the waste pipe *P*. This is the main point in Mr. Knight's invention, and the secret of smooth working in his machines. These two piston valves at *M* are operated by a lever *N*, and a second tappet rod *O*, which imparts a slow movement to the valves. The valves thus begin to close and choke the exhaust soon after the piston has reached its maximum velocity, and gradually bring the water, and also the heavy pump rods, to a state of rest at the end of the stroke, just as a crank would do. As the tappets on the rod *H* outrun the main valves at *D D* by a foot or more of piston movement, it leaves the range of stroke to be controlled by the rod *O* and the retarding valves at *M*, so that by shifting the collars on the rod *O* the reciprocating parts can be cushioned and brought to a state of rest, avoiding all shock and danger to the pipes or machinery. In this matter Mr. Knight has found his greatest difficulty, and, besides arranging his engines in the manner explained for easy cushioning, has to place air vessels on the pipe lines to avoid shock.

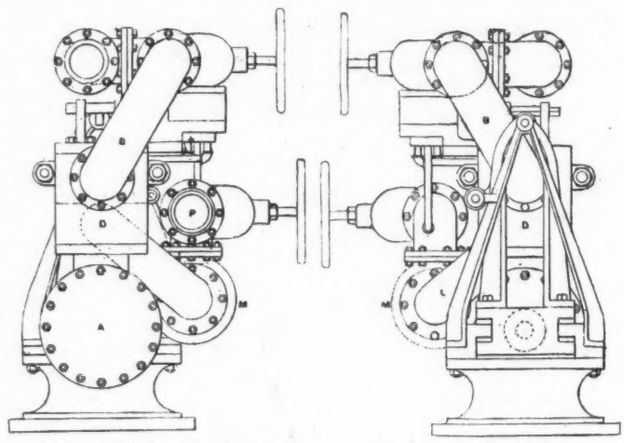


FIG. 4.—BACK END VIEW. FIG. 5.—FRONT END VIEW.

DIRECT ACTING HYDRAULIC PUMPING ENGINE.

Calculations of the Distance of the Stars by Spectrum Analysis.—Mr. Pickering, of Cambridge, Mass., recently made the discovery that the fixed star Mizar, in the Great Bear, is a double star. That its spectrum is subject to changes was already known to Draper, but a great many photographs of its spectrum taken by Mr. Pickering showed a periodical doubling of the spectral lines in every fifty-two days. Each half of the line changed so much as to correspond to about $\frac{1}{4000}$ of the wave length, or, as light travels 40,000 miles per second, to a speed of the light source of ten miles per second: and as the change takes place on both sides at the same time, *the* star consists evidently of two stars revolving around each other in opposite directions. The period of a whole revolution is 104 days, the extent of the orbit is about 90,000,000 miles, and the distance between the two stars about 30,000,000 miles. The mass of the star was formerly calculated, from the lines of the spectrum, to be forty times that of our sun. The mass of each of the two stars into which Mizar now is resolved is found, by application of Newton's law, to be twenty times that of our sun. The greatest telescope shows the two stars 30,000,000 miles distant from each other as one—a fact that proves the enormous distance between Mizar and our sun system.—*A. Ritter* in *Zeits. des Ver. Deuts. Ing.*

THE MINING INDUSTRY IN THE TRANSVAAL.

Written for the Engineering and Mining Journal by Charles H. Gibson, M. E.

Like all mushroom mining camps, Johannesburg or the Witwatersrandt (white waters range) has seen its big boom, has foisted upon the too confiding public many wildcats with the good mines, and has now reached the middle stage of temporary collapse. Since the beginning of the year the monthly output has decreased several thousand ounces, that for March being 37,602 ounces; the capitalists who had invested in "prospects" tired of putting out money with no returns, causing many of the small companies to abandon work. Some claims were forfeited for non-payment of the monthly tax, as did the Johannesburg Water Works Company, and this, together with the trouble resulting from the hauling down and destroying of the Transvaal flag here in the market place, so frightened the London public that there was a scramble to realize on South African stocks and consequently an almost total demoralization of the market. Not, however, until the Berlin investors had applied for and received a goodly share ofthe scrip, and had in turn passed it to the Vienna Exchange, Johannesburg is said to be on the eve of a financial crisis; the banks are pressing for overdrafts to be made good, and have even fixed a date when settlements must be made. The present state of depression should not surprise those who have followed the history of the stock market here, for the wholesale depreciation is almost unprecedented. Since the middle of February, 1889 there has been a shrinkage in market values of over £17,000,000 ($85,000,000) in the thirty mines given in the following list, whose aggregate capital is £7,174,000, which represents but one-sixth in number and one-third of the value of the South African mining and estate companies, and there has been a proportionate depreciation all along the line. It is the opinion of some that because the present market value is below the par of the stocks the bottom has been reached, but many of the companies are capitalized far beyond their actual value, and when the banks put on the pressure and begin to sell customers out, it will be seen how far from the bottom the market is now.

I said above, "temporary collapse" because I believe in the future of the Transvaal as a gold-producing country. At present the mining industry labors under many disadvantages, and most all conditions necessary for economical and successful mining are lacking. There is no timber in the country; a stick 6 or 8 inches thick by 8 feet in length costs $3, a two-inch plank $8, and all other lumber in proportion. Water is so scarce that all houses are supplied with tanks to catch the rain-water, and the mines have reservoirs and dams for a like purpose. The mine water is run to the mill and the tailings are allowed to settle and the water pumped back to the mill. Freight on all kinds of material varies, according to the supply of wagons and the condition of the roads, from $2.75 to $5 from Kimberley, 298 miles, and averages $7.50 from the seaboard per 100 pounds. Last year the custom house returns showed that one hundred and thirty million pounds of freight, exclusive of bread stuffs, personal baggage and goods entered free, were brought into the Transvaal, which cost the enormous sum of £1,950,000 for freight alone. What is bought for £1 in England costs nearly £3 here. Railroads are sadly needed and would be built but for the opposition of the government. Wages are very high, white men getting £1 per day and Kaffir natives 16 to 18 shillings and board per week. The tax on mining property is far beyond what it should be; each claim of 150 feet along the vein and 300 feet across it pays £1 per month; a mill site, although on the mining property, pays another tax, as does also the water right, which is generally only the privilege of damming a depression in the surface to catch and store the rain water; a special license is also required to quarry stone on the company's property. And if these taxes are not promptly paid monthly, the claims are forfeited and jumpable, there being no freehold here.

Coal is laid down in town at from 16 to 35 shillings per ton, according to quality, but there is little of it that will coke. Many of the existing evils are to be done away with by the Volksrad, which meets next month; railroads are to be allowed to enter the republic, water is to be brought in (?), taxes on mining property are to be reduced, the tenure of real property secured, etc. But these things are yet to be accomplished.

Mining and milling buildings were of the crudest in the early history of the camp, and some of the mining companies are now struggling with the mistakes of the former managers and mill men. Shafts were sunk within 20 feet of the end lines, mills were built down in the spruits and sunk into holes besides. This is being changed as more experienced men come into the camp. Until quite recently the successful companies were satisfied with their saving of 55 to 60 per cent. of the gold, giving little heed to that in the sulphurets and slimes, but now the free gold has diminished, and continues to diminish so much, as depth is attained, that attention has been given to concentration and treatment of the sulphurets. Several processes have been introduced here, the Hungarian, the Newberry-Vautin and the Cassells-McArthur Cyanide. The first two with indifferent success, I believe, and the last is now being tried. Frue vanners have been at work some time, at the Robinson Consolidated mine, and the mill manager tells me that he is quite satisfied with the results obtained.

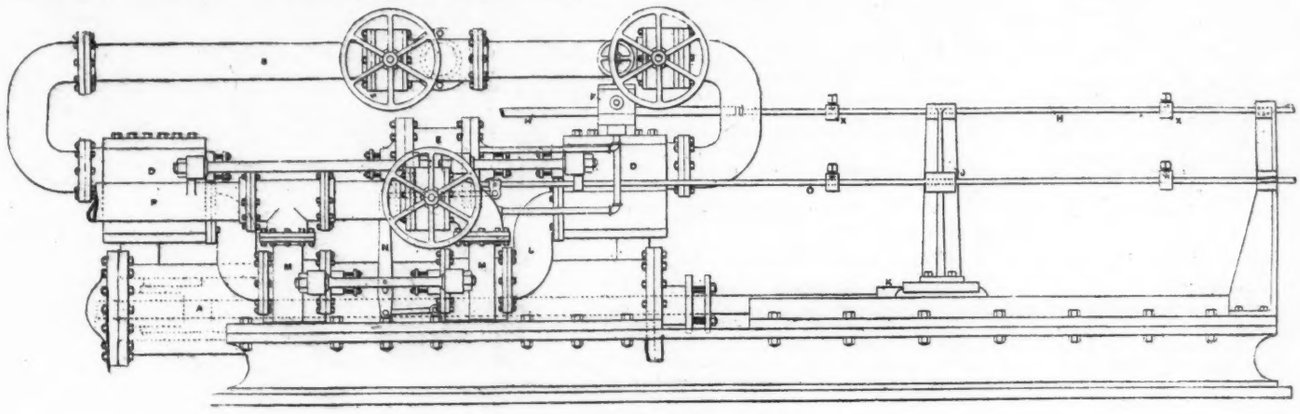


FIG. 2.—SIDE ELEVATION OF PUMP

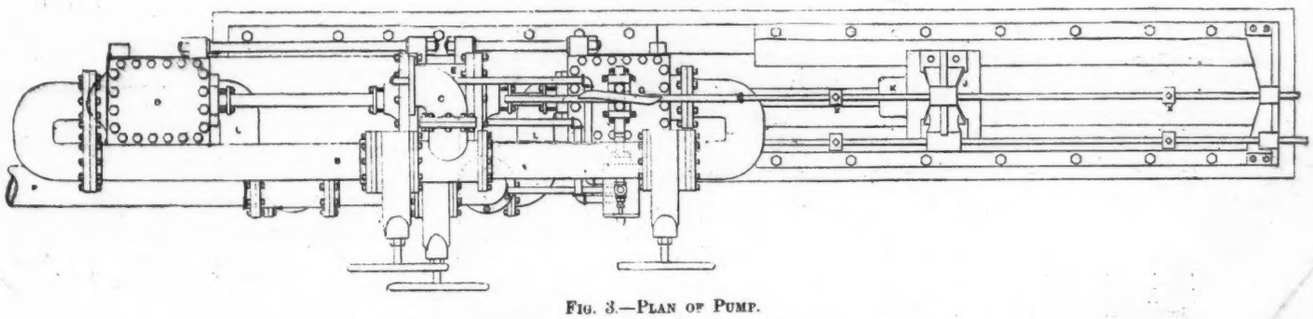


FIG. 3.—PLAN OF PUMP.

DIRECT ACTING HYDRAULIC PUMPING ENGINE—PLUMAS EUREKA MINE, CAL.

That there is gold here in paying quantities has been proven beyond a doubt, but until the conditions are changed the profits will be small and the development of the country retarded.

MARKET VALUATION.

	Feb. 15, 1889.	Mar. 4, 1890.	April 1, 1890.
Crown Reef	$1,100,000	$398,750	$385,000
Aurora	206,500	37,500	18,750
Banket	525,000	100,000	50,000
Bantjes	404,000	71,000	47,500
City & Subur	1,056,000	415,000	316,875
Croesus	308,700	69,000	48,750
Durban Roodepoort	850,000	375,000	287,500
Evelyn	319,000	70,000	25,500
Ferreira	792,000	437,000	396,000
Geldenhuis	510,000	190,000	120,000
Henry Nourse	425,000	187,500	162,500
Heriot	510,000	142,500	120,000
Jumpers	862,500	306,250	240,000
Jubilee	247,000	117,000	91,000
Knight's	844,000	312,500	125,000
Langlaagte	2,268,000	1,350,000	1,188,000
Main Reef	742,000	180,000	90,000
Moss Rose	236,000	60,000	56,000
Nabob	310,000	46,000	56,000
New Grahamstown	297,500	90,000	56,000
Pioneer	63,000	105,000	84,000
Randfontein	5,000,000	1,750,000	1,500,000
Robinson (5)	3,225,000	1,625,000	1,500,000
Royal	115,000	50,000	5,000
Salisbury	825,000	153,000	112,500
Simmer & Jack	900,000	310,000	250,000
Stanhope	217,500	98,000	90,000
Van Ryn	600,000	100,000	100,000
Wemmer	640,000	180,000	180,000
Wolhuter	414,000	95,000	84,000
	$24,812,700	$9,421,000	$7,768,875

JOHANNESBURG, April 18th, 1890.

PHOTOGRAPHING IN COLORS.

Experiments with a view to photographing in permanent colors have been made by Herschel in 1840, by Becquerel from 1847 to 1855, and by N. de St. Victor from 1851 to 1866, but without a coating of varnish the colors thus obtained faded within a couple of days at the longest. Now, Mr. Franz Veress, of Klausenburg, Transylvania, has discovered a process to produce very brilliant colors that have so far stood the test of a three weeks' exposure to ordinary daylight without suffering any change. The photographs have been exhibited during a lecture at the "Society for the Propagation of Natural Sciences," and in the Photographic Institute of Vienna, Austria, but not yet exposed to the direct sunlight.

The photos are upon glass and upon paper. The former are diapositives, and, if looked through, show for the most part a ruby-red ground color, with a picture in bright, sometimes brilliant colors, from the deepest hue of ruby-red—far deeper than the ground color—to light orange, with several shades of red and yellow, and from violet to aniline blue, and the intensest, most brilliant blue. The same colors prevail also on the paper-positives, which have all a greyish-brown ground color, upon which the red inclines more to purple than ruby, and the violet is especially brilliant. Green is missing on all positives. Examination through a magnifying glass fails to detect any impurities in the pigment of the colors, or vagueness in the contours of the pictures, and each color stands out from the other with striking distinctness. It is not known whether the colors are a real pigment or the effect of thin layers.

The sensitive preparation is a silver chloride emulsion in collodion or in gelatine, and the solution, the preparation of which is the inventor's secret, is poured upon the glass or the paper, where it soon takes a brownish-red color. The plate is put into a copying frame and exposed to the rays from a transparent colored drawing, of which the negative picture is soon visible. The exposure has to last in the case of glass negatives two or three hours, and, in case of paper, at least three days, as the colors come out very slowly, but the picture having been fixed in an alkaline bath the colors become brighter and more intense. The process in the camera would require an exposure lasting several weeks, but the latest improvements have greatly lessened the time of this kind of exposure only, especially for the paper negatives. The invention is believed to rest on a modification of the process described by H. Carey Lea some two years ago, of applying the photo chlorides of silver in the form of an emulsion.

MINERAL EXPORTS OF NEW SOUTH WALES

The following comparative table, showing the mineral exports from New South Wales during the years 1888 and 1889, is compiled from information given in detail in the statistical register of the colony the first part of which, for 1889, comprising the figures relating to trade and commerce, has lately been issued. From this it will be seen that there has been an increase in the value of this class of exports of nearly a million sterling. The Broken-Hill silver mines have, of course, the lion's share in bringing about this gratifying result, but they by no means stand alone. The value of silver, silver-lead and silver ore exported in 1889 exceeds the figures for 1888 by £828,793, an increase of about 80 per cent. Next in importance stands coal, with an increase of £214,799, or 20 per cent. The other lines which show increased exportation in 1889 are antimony and antimony ore, bismuth and its ore, copper ore, gold, both in bars and dust and in coin, kerosene shale, and lead. In the other items which go to make up the list, there was more or less of falling off in the value of the export, caused in some instances chiefly by fall in the market price of the metal:

EXPORT OF MINERAL PRODUCTS FROM NEW SOUTH WALES

	1889		1888	
	Quantity.	Value.	Quantity.	Value.
Antimony (auriferous)	1,316 cwt	£1,091	384 cwt	£553
Antimony ore	3,112 cwt	2,250	3,423 cwt	2,385
Bismuth	206 cwt	7,060	22½ cwt	410
Bismuth ore	644 cwt	5,737	349½ cwt	3,501
Bricks (including fire-bricks)	266,890 No.	642	232,650 No.	942
Coal	2,387,702 tons	1,279,271	1,923,872 tons	1,064,472
Coke	9,522 tons	15,043	15,249 tons	24,931
Copper (refined)	81,296 cwt	207,009	75,721 cwt	272,110
Copper (regulus)	901 cwt	1,166	1,176 cwt	2,345
Copper ore	3,063 cwt	2,156	1,090 cwt	579
Fireclay	240 cwt	37	280 cwt	37
Gold (bars and dust)	10,906 oz 2dwt	44,649	6,896 oz 4 dwt	28,023
Gold quartz	2,163 pkgs	2,938	6,523 pkgs	8,426
Gold coin		277,082		138,317
Iron oxide	9,781 cwt	1,329	15,286 cwt	2,067
Kerosene shale	21,386 tons	59,835	18,331 tons	52,684
Lead (pig)	10,446 cwt	6,721	3,575 cwt	1,941
Manganese ore			460 cwt	75
Minerals not specified	1,917 cwt	719	2,386 cwt	3,438
Pyrites	171 cwt	141	64 cwt	18
Silver (ingots)	416,895 oz 7dwt	72,001	375,063 oz 14dwt	66,668
Silver-lead	691,836 cwt	1,565,290	362,045 cwt	911,117
Silver ore	839,309 cwt	333,907	234,787 cwt	164,620
Tin (ingots)	88,173 cwt	403,182	91,242 cwt	569,182
Tin ore	4,687 cwt	11,805	4,948 cwt	13,314
Total value		£4,301,061		£3,343,155

The increase in export values during the past year, £957,906 is equal to nearly 29 per cent. It is more than two-fifths of the total increase in the exports from the colony which 1889 shows as compared with the previous year. The statistical returns of production are not yet issued, and it is from them and not from export figures that the condition of gold-mining during the year is to be judged. The export of gold is not regulated by the output but by the state of exchanges. In regard to other metals the export returns are the best index we have as to the condition of the mining industry. Taken as a whole they are decidedly encouraging. So much attention has been given to silver mining of late, and so much capital directed towards it, that it would not have been surprising had the production of other metals suffered in consequence. No doubt this has been the case to a certain extent, but happily not sufficiently to prevent the former export from being maintained, and in some cases exceeded. It should be mentioned that the figures given above for gold coin exported have been arrived at by deducting from the total exports the value of coin imported, and that of the bars and gold-dust sent from other colonies to be minted in Sydney. The actual amount of gold coin exported from the colony during 1889 was £3,157,965.

THE MANUFACTURE OF PORTLAND CEMENT FROM SLAG.

We take from our contemporary *Industries* the following description, with illustrations, of the plant required in the manufacture of Portland cement from basic slag. The use of this slag for Portland cement has met with great favor in France and Germany from engineers and contractors, and now in England more confidence is placed in it than when it was introduced at first, especially for sea-walls and subaqueous work generally.

A good Portland cement made from slag consists of an intimate mixture of granulated slag and about 25 per cent. of lime, reduced to a very fine powder by mechanical means. Early in the manufacture of this cement it was pointed out by Mr. C. Wood, of the Tees Iron works at Middlesbrough, that a preliminary granulation of the slag was absolutely essential for the preparation of a satisfactory cement. This granulation appears to bring about both chemical and physical changes in the slag, causing the silica and alumina present to attain a condition of readiness to combine with the lime which is subsequently added, and when examined under the microscope the granulated slag is found to contain clear and brilliant grains imbedded in the matrix instead of the dark aggregates which are characteristic of the original slag. In fact, it is possible by a microscopical examination to judge of the value and completeness of the granulation process by noting the relative

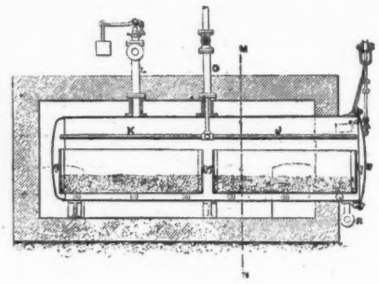


FIG. 1.

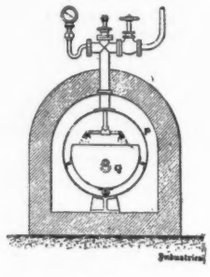


FIG. 2.

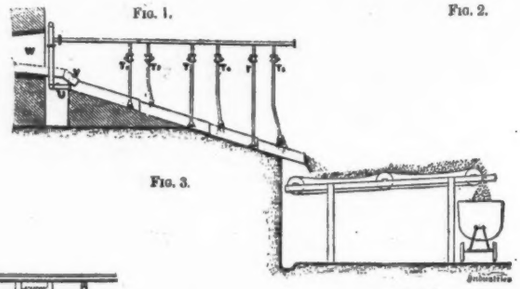


FIG. 3.

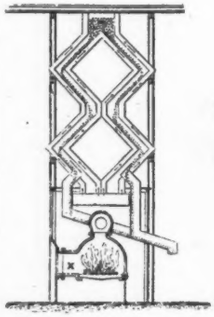


FIG. 4.

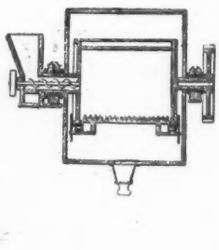


FIG. 5.

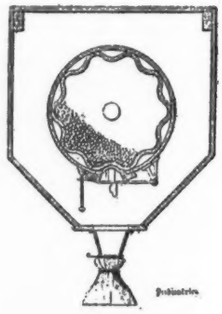


FIG. 6.

THE MANUFACTURE OF PORTLAND CEMENT FROM SLAG.

proportions of these two kinds of appearances, and it is customary to reject as unsuitable for the preparation of a hydraulic mortar those granulated slags which show a preponderating number of black granules. Early experiments also established the fact that the basic slags such as those obtained in the basic steel process were only suitable for this manufacture, and at present, even by largely increasing the percentage of added lime, the almost neutral and acid slags have not been rendered available for cement making. In calculating the amount of lime to be added, it is found that when the ratio of the sum of the oxygen in the silica and alumina of the slag to the amount of oxygen in the added lime is as 2:1, then the best quality of cement is obtained. According to Tetmajer, when the ratio of lime to silica in the slag is less than one, then the slag is unsuitable for this manufacture. In those slags which contain an appreciable quantity of calcium sulphide this substance must be regarded as equivalent to so much lime present, since in the process of granulation it is decomposed by the water thus:

$$CaS + H_2O = CaO + H_2S.$$

As pointed out by Mr. Redgrave in the discussion which followed the reading of his paper, the presence of calcium sulphide in the slag is of very small importance, as up to 3 per cent. it produces no injurious effects upon the quality of the cement, except rendering it slightly slower in setting. Sometimes it is found necessary to add, in addition to the lime, some gelatinous silica and alumina, both of which can readily be obtained from some unused slag by treating it with hydrochloric acid and

filtering off the insoluble silica, when the alumina can be precipitated from the filtrate by the addition of lime. The additional alumina is also sometimes obtained from sodium aluminate obtained by fusing bauxite with soda.

In Figs. 1 and 2 is shown one of the forms of plant employed in Germany for converting the quicklime into dry slaked lime. It possesses the advantages of being very convenient for regulating the quantity of water to be added, of lessening the amount of hand labor, and preventing the formation of dust, which is so injurious to the workmen. The lime in coarse lumps is placed in the receiver Q, which rests on rollers and is inclosed in the larger cylindrical vessel P. This vessel P can be closed at S after the lime is introduced, L being a safety valve and pressure gauge to record the pressure, which may rise to 80 lbs. or 90 lbs. per square inch. The water is introduced by opening a cock which allows the water from a reservoir to flow down O into the pipe $K\,J$, which distributes the water uniformly over the lime. After remaining in the apparatus for some little time, the heat generated by the slaking causes the excess of water to pass away from the lime and condenses on the walls of the containing vessel, so that on removal the lime is found to be completely slaked and in the form of a dry powder ready for mixing with the slag.

The granulated slag often contains from 15 to 30 per cent. of water, and before being used it is necessary to remove this water by drying. The simplest method consists in exposing the slag in a thin layer on a hot plate, and it is possible to dry completely 100 kilograms per square meter of surface per 24 hours in this way, with a consumption of 6 to 7 kilograms of coal. There is, however, a good deal of handling and labor connected with this method, and many processes are in use which are more or less continuous in action and more economical in labor and fuel. The drying apparatus devised by Ruelle and used in France in the phosphate industry, has been used with success for drying granulated slag. We illustrate this apparatus (Figs. 7, 8, 9 and 10), which, it will be seen, consists of a long rotating cylinder containing the slag, and through which a current of hot air circulates. At A the air is heated, and at B it enters the cylinder, through which it is made to circulate by means of a ventilator. The rotating cylinder consists of two long slightly conical columns about 10 meters in length. The internal cone has its base nearest the fire, and is fitted with four helices, which regulate the motion of the slag within, so that it is uniformly exposed to the drying action of the hot air. The outer cone has its base away from the fire, and is supported at Y and Z, and within has four friction rollers, on which the internal cone rotates. With this apparatus 25 tons of slag can be dried in 24 hours with an expenditure of 6 kilograms of coal per 100 kilograms of slag for heating the air and a motive power of 6 to 7 H. P. The apparatus, with ventilator, costs between £500 and £600. Other methods of drying the slag are in use at Choindez, in Switzerland, and at Saulnes, where recently M. Raty has erected important works for the manufacture of cement from slag. In the process patented by M. Raty the slag is granulated and dried in one operation. The apparatus is illustrated in Fig. 9. The slag, as it issues from the furnace in a molten state, flows down a metal channel, which is cooled by water (from T_2, T_4, and T_6) on the outside, and at the same time comes in contact with a small quantity of water (from T_1, T_3, T_5) within. It will be seen that in this method the cooling must be so regulated that the slag becomes hard and granulated, and also sufficiently porous, before it reaches the end of the inclined plane, and at the same time must not prevent the evaporation of the water from the pores of the slag, so that it may be delivered in a dry condition on to the metallic running band. The length of the channel depends on the nature of the slag. M. Grosclaude, to whom we are indebted for this description, does not state whether the process is one which has come up to the expectations of the patentee. It seems to us that when once the proper dimensions for the successful delivery of the slag in a suitable condition for cement-making at the bottom of the channel are obtained, the process should be one of great value, but we are unable to say whether the inventor is prepared to give data for these dimensions for varying amounts of slag. Fig. 4 shows a section of an air drying arrangement in use at some works.

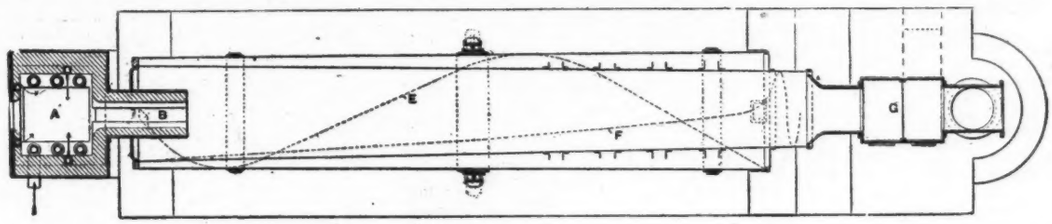


FIG. 7.

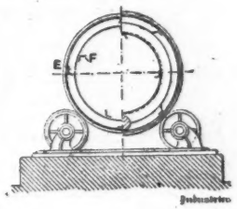


FIG. 8.

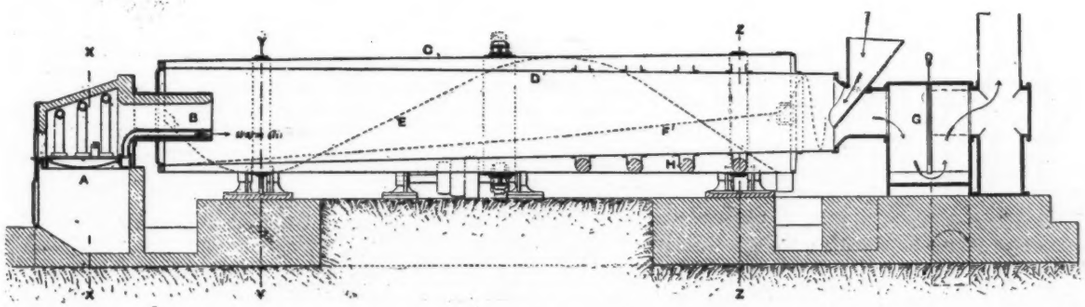


FIG. 9.

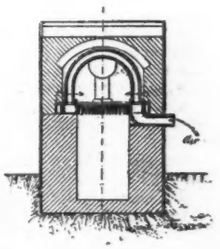


FIG. 10.

THE MANUFACTURE OF PORTLAND CEMENT FROM SLAG.

After the slag is granulated and dried, it is next ground to a fine powder in an ordinary mill. It is then ready for mixing with the requisite amount of dried slaked lime, which operation is effected in a specially constructed ball mill. We illustrate in Figs. 5 and 6 the mill, which is constructed by Luther, of Brunswick, for this purpose. It consists of a cylinder which can be rotated about a horizontal axis, and contains a large number of metallic balls about 25-35 millimeters in diameter. The mixture of lime and slag is added by means of a screw feeder below the hopper. When the cylinder is nearly full, it is set in motion for about two hours, when the lime and slag are not only intimately mixed, but reduced to an exceedingly fine powder. By an opening in the side of the cylinder the contents can be emptied into a bag placed for the purpose, a grating preventing the metal balls from falling with the powder into the bag. Other mills for this purpose have been constructed by Thivet-Hauctin, of St. Denis. M. Grosclaude concludes his description by giving an estimate of the cost of erection of an installation for the manufacture of cement from basic slag. He estimates that to produce 20 tons a day, or 6,000 tons per annum, the necessary outlay in plant, consisting of a Ruelle dryer, an engine of 150 horse power, a furnace, and all necessary mills, grinders and mixers, as well as bags and barrels for holding materials and finished product, would be about £6,000. His estimate of production, including labor and fuel, and interest on capital, is 18·584 francs per ton of cement; but he further adds that this estimate is probably much too high, and states that in France, in those iron works which have erected cement-making machinery for utilizing their slag, the cost of production does not exceed 12 francs per ton. As the selling price of cement in France is about 35 francs per ton, this shows that a considerable profit can be made out of this industry.

Long Distance Heliograph Signaling.—The greatest achievement yet made in heliography was accomplished during practice in the Department of Arizona, on the 17th inst., by Lieutenant Wittenmeyer, who succeeded in signaling a message by a signal flash 125 miles from Mount Reno, near Fort McDowell, to Mount Graham, near Fort Grant, where it was received by Captain Murray. The latter, by turning his instrument, flashed the message to Fort Huachuaca, a distance of 90 miles, making a distance of 215 miles, with a single intervening station. The longest distance heretofore made with a signal flash is said to be about seventy miles.

Suffocated by Quicksand.—A most extraordinary accident occurred at Woodside, Long Island, N. Y., May 17th. A man engaged in clearing a drain pipe driven but a few feet below the surface was caught by quicksand, and despite the utmost efforts of a large number of workers, perished after a struggle of five hours and a half. At first it was attempted to dig him out, but the space was too limited to work effectually in. Then a strong rope was passed about him, a purchase rigged, and simultaneously with the digging, it was attempted to haul him out; but the strain was too great to be borne, and he begged them to desist. Then the rope was made fast with a less strain, in the hope that he could be held until rescued, but it had to be slowly slackened from time to time. Meanwhile, a rubber tube had been passed to him, that he might breathe when completely engulfed. At this time his head only was above the surface, but his hands were free. A gang of men began excavating a pit near by in order to draw off the quicksand and reach him from below. He sank slowly, inch by inch, and lived for an hour after being entirely submerged, except one hand, still breathing through the tube. An hour after he died the body was cleared from below and was then drawn out. Probably, had the work of digging the relief pit to one side been begun earlier, the man might have been saved, but at first the terrible power of the quicksand was not realized, and the workers could hardly be blamed. Among them were apparently just the men, next to *miners*, to use the most efficient means of rescue. They had among them a building contractor, carpenters, a physician and many artisans and laborers, and, according to accounts, worked without confusion.

RECENT PROGRESS IN SULPHURIC ACID AND ALKALI MANUFACTURE.

Sulphur.—In spite of the nearly complete abandonment of sulphur for acid making in Europe, the production of the Sicilian deposits has not declined, as is indicated by the following table:

PRODUCTION AND DISTRIBUTION OF SICILIAN SULPHUR (LONG TON).

	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Exports to England	41,788	40,760	33,402	30,236	31,086	37,455	37,633
" France	63,602	65,098	58,264	54,780	56,221	53,927	68,632
" Italy	66,810	56,252	49,415	48,658	46,818	48,436	44,317
" America	96,629	94,929	99,378	98,590	88,503	128,953	111,838
" all other countries	67,563	56,829	74,123	97,691	89,728	86,590	99,592
Total	336,392	313,908	314,582	329,455	312,446	355,361	362,012

This country has for many years imported more sulphur than any other; the above table shows that more than one-third of the Sicilian product came to America in 1888. In addition to this, constantly increasing quantities of sulphur are imported into this country from Japan, amounting in 1888 to 6,332 tons. Practically no sulphur was mined in the United States in 1888, the deposits at Cove Creek, Utah, not having been worked, although they produced 3,000 tons in 1887.

Considerable quantities of sulphur, recovered from tank waste in England by the Chance process, have been sent to this country during the past year, the importations for 1889 amounting to about 1,000 tons. The writer is informed by Mr. George Linder, of Boston, the American agent for the Chance company, that contracts have been made for 500 tons per month during the present year. The Chance sulphur is nearly chemically pure, and commands a higher price than the Sicilian crude; its chief use thus far is in making sulphur dioxide for the sulphite process of wood pulp manufacture. It would seem particularly well suited for gunpowder making, but has not yet been adopted for this purpose.

The refining of sulphur is still chiefly carried on at Marseilles, where there are now six refineries in operation. These works, with five others at various points in the south of France, produce annually about 60,000 tons of refined sulphur, a very large part of which is used to combat diseases of the vine.

Pyrites.—The Spanish and Portuguese mines are producing pyrites in undiminished quantities. More than 2,000,000 tons were mined in 1887. The importation of pyrites into England shows no falling off, in spite of the precarious condition of the Leblanc soda process. According to the Board of Trade returns, the quantity of pyrites imported into the United Kingdom during the past six years is as follows:

Importation of pyrites into the United Kingdom (long tons):

1884	563,073
1885	654,521
1886	556,968
1887	597,595
1888	617,252
1889	643,879

This is practically all supplied by three great companies, the Tharsis and Rio Tinto, in Spain, and Mason & Barry, Portugal. The Rio Tinto Company made efforts some years ago to introduce Spanish pyrites into France and other countries,* and to this end established a large plant for the manufacture of Leblanc soda and treatment of pyrites cinders for silver, gold and copper, at Marseilles. These works are still in operation, but owing to the unpromising outlook of the Leblanc process, the project of erecting similar works in Belgium, Austria and America has been abandoned. French pyrites, containing no copper, mined at various points along the course of the Rhone, is employed at all the chief alkali works in France.

In America the production of pyrites has increased considerably within a few years. In 1888, 54,331 tons of pyrites were mined in the Eastern States, chiefly at the Davis mines, Franklin County, Mass. Large quantities of ore are also imported from Canada and Spain. According to W. H. Adams (*Manufacturers' Record*, February, 1890), the mines of Virginia will produce during the present year fully 70,000 tons of pyrites. The same writer estimates the consumption of pyrites for the present year at 250,000 tons. The importations from Canada will probably reach 50,000 tons.

Treatment of Pyrites Residue.—The treatment of the cinders from burnt Spanish pyrites by the Henderson process is carried on in England on an enormous scale, and is constantly increasing. In 1888, 420,415 tons of burnt ore were treated in Great Britain, producing 15,135 tons of copper, 337,500 ounces of silver, and 1,918 ounces of gold.

Theory of the Sulphuric Acid Process.—Within the past few years the question of the precise nature of the reactions which take place in the lead chambers has been fully discussed by Lunge, Raschig and others, and much light has been thrown on the various stages of the process. An able review of this work has been given by Dr. Hamburger,† and need not here be repeated. The chief conclusions reached may, however, be briefly stated.

Lunge,‡ by a careful study of the gasses present in chambers in actual operation, found that nitrogen peroxide (NO_2) is rarely present, and can only exist in practical absence of moisture and sulphur dioxide. Nitrous anhydride, N_2O_3, is the active agent in the production of sulphuric acid. This view was held by Berzelius, who expressed the reaction in the following way:

$$SO_2 + N_2O_3 + H_2O = H_2SO_4 + 2\,NO \text{ and } 2\,NO + O = N_2O_3.$$

Lunge showed that these reactions cannot be correct, since, if true, sulphuric acid whenever formed should be accompanied by a corresponding quantity of nitric oxide; whereas nitrous anhydride only is present in the greater part of the chamber space. Further, nitric oxide and oxygen do not give nitrous anhydride, as indicated by the second reaction, but yield nitric anhydride or nitric acid, according to the absence or presence of water. These observations upset all theories based upon the reduction of nitrogen compounds to nitric oxide. Nevertheless, nitric oxide is found to be present to some extent in the first chamber. Lunge considers the material of the "chamber crystals," or nitrosulphonic acid, $SO_2(OH)NO_2$, to be an important intermediate product in the synthesis of sulphuric acid. In view of these observations the course of the reaction appears to be as follows:

In the first chamber the gases meet in the most concentrated state and at the highest temperature, and probably react thus:

$$SO_2 + NO_2 + H_2O = H_2SO_4 + NO,$$
$$SO_2 + N_2O_3 + H_2O = H_2SO_4 + 2NO.$$

The nitric oxide immediately combines with sulphur dioxide, oxygen and steam to form nitrosulphonic acid:

$$2SO_2 + 2NO + 3O + H_2O = 2SO_2(OH)NO_2.$$

The nitrosulphonic acid is decomposed by steam;

$$2SO_2(OH)NO_2 + H_2O = 2H_2SO_4 + N_2O_3.$$

Or, in the presence of excess of sulphur dioxide and steam, and at a high temperature, the decomposition may take place as follows:

$$2SO_2(OH)NO_2 + SO_2 + 2H_2O = 3H_2SO_4 + 2NO$$

This reaction takes place in the Glover tower, and accounts for the presence of nitric oxide in the first chamber. Lunge explains the loss of niter in the process by the reduction of part of the nitrogen compounds to lower oxides or free nitrogen, and also the formation of nitrogen peroxide in the last chamber on account of too great excess of nitrous gases and deficiency of sulphur dioxide.

Present Condition of the Alkali Industry.—In spite of the strikingly rapid growth of the ammonia-soda industry, there has been no decline as yet in the production of alkali in Great Britain by the Leblanc process. This is shown by the statistics of the importation of pyrites, and by the following table compiled from the latest alkali inspectors' reports.

Salt decomposed by both processes in the United Kingdom (tons):

	1884.	1885.	1886.	1887.	1888.
Leblanc process	578,874	598,096	584,723	577,281	690,312
Ammonia-soda process	89,759	115,032	137,220	158,636	212,181
Total	668,633	713,128	721,943	736,017	902,493

These figures show that in Great Britain the older process is holding its own, though the world's growing demand for alkali is supplied by the increase of the new industry. Weldon showed five years ago that soda ash can be produced fully one-third cheaper by the ammonia-soda makers; the survival of the Leblanc process is, therefore, due to the enormous demand for bleaching powder (which has not yet been made economically by any other method), and to the profits gained in the treatment of pyrites cinders. Another important gain to the Leblanc industry is the success of the Chance process of sulphur recovery, which has now been introduced into most of the leading alkali works of Great Britain and the Continent. The effect of this new source of profit will be shown in the returns for the present year. The Leblanc alkali makers have lately devoted themselves almost entirely to the manufacture of caustic soda and soda crystals, for which the older process possesses important advantages over the new.

Outside of England the advance of the ammonia-soda process has been even greater, while the production of the Leblanc works has fallen off in a marked degree. According to the Paris Exhibition Circular of the Solvay Company, the world's total production of alkali in 1888, calculated as soda ash, may be estimated at about 900,000 tons. Of this amount 430,000 tons, or about one-half, was made by the ammonia-soda process at the various Solvay works. The latter have increased their production still further during the past year, so that it may probably be safely said that more alkali is to-day produced by the ammonia process than by that of Leblanc.

There are now ten Solvay works in operation, the location and output of which are as follows:

	Tons.
Belgium (Couillet)	17,000
France (Varangeville-Dombasle)	100,000
England (Brunner Mond & Co., Northwich)	125,000
Germany (Wylhen, Bernburg and Saralbe)	100,000
Russia (Beresniki and Lissitchansk)	17,000
United States (Syracuse, N. Y.)	60,000
Austria (Ebensee, Salzkammergut)	11,000
	430,000

The works at Geddes, near Syracuse, now supply about one-third of the American demand; in addition to the product of these works there was imported from England in 1888, 125,155 tons of alkali.

Other modifications of the ammonia-soda process, such as that of Parnell and Simpson, and the Schloesing process, introduced by Bell Bros., Middlesbrough, England, are worked only on an experimental scale and do not yet play an important part in the alkali industry.

The Hargreaves Process.—The direct conversion of salt into sulphate of soda by the action of sulphur dioxide and steam has come into increased use during the past few years. There are now five works in England using this process, and also one in Ireland and two in France. During the year 1888 these works produced 43,080 tons of sulphate. The advantages of this method over the ordinary salt-cake process are the avoidance of the cost of making sulphuric acid, and the purity and freedom from iron of the sulphate so obtained. No fuel is found necessary, the heat of the reaction being sufficient after the operation is once started. The disadvantage of the method is the high first cost of the plant. Nearly all the plate glass now produced in Lancashire is made from Hargreaves sulphate.

Chlorine and Bleaching Powder.—The Weldon-Pechiney process, based upon the decomposition of moist magnesium oxychloride by heat into magnesia, hydrochloric acid and free chlorine, is in successful operation at Salandres, France, and has been introduced on a large scale at the works of Albright & Wilson, at Oldbury, near Birmingham, England. This method accomplishes the final conversion into free chlorine of more than 90 per cent. of the hydrochloric acid employed, while the Weldon process, now universally employed, yields only one-third of the chlorine in a free state. An interesting application of the new process has been made at Szczakowa, Galicia, in the manufacture of chlorine from the waste products of the ammonia-soda industry. The residual calcium chloride is converted into magnesium chloride by treatment with magnesia and carbon dioxide

$$CaCl_2 + MgO + CO_2 = CaCO_3 + MgCl_2,$$

(as in the last stage of the old Schaffner and Helbig method of sulphu

* Weldon, *J. Soc. Ch. Ind.*, 1883, p. 4.
† *J. Soc. Ch. Ind.*, 1889, p. 164.
‡ *Chemische Industrie*, 1884, p. 5.

recovery). The magnesium chloride is treated by the Weldon-Pechiney process for the production of chlorine, and the residual magnesia used over again. This method is a partial solution, at least, of the great problem of the production of chlorine from salt in connection with the Solvay process. The great obstacle to the employment of the Weldon-Pechiney process on a large scale is, however, the dilute condition of the chlorine liberated, which makes it unfit for the manufacture of bleaching powder. At present the method is employed solely for the production of chlorates, for which it is especially adapted. Until the problem of the manufacture of bleaching powder from this weak chlorine is successfully worked out, it is not to be expected that the process will have an important influence on the alkali industry.

Other methods for the production of chlorine from the ammonia-soda residues appear to be unpromising. The Solvays are making hydrochloric acid on a small scale, at the Varangeville works, by heating calcium chloride with silica, but the plan makes no progress and is probably very uneconomical. Mond's method of obtaining ammonia and chlorine by passing ammonium chloride vapor over heated nickel or cobalt oxide is still wholly in the experimental stage, though the inventor promises full success in two years at farthest.

Recovery of Sulphur from Tank-Waste.—The Chance process has been introduced at twenty works in Great Britain, one in Austria, and one in France. It was recently stated by the manager of the St. Gobain Company, France, that the sulphur so regained is sold at a price equal to three times its cost in the form of pyrites. Considerable quantities of the Chance sulphur are already being exported to America. An important advantage of the process to English alkali makers consists in its availability for the production of either sulphur or sulphuric acid. If pyrites is cheap, sulphur is manufactured and exported to America and other countries; if pyrites is expensive, the hydrogen sulphide produced from the tank-waste is simply burned to sulphur dioxide and used over again for making acid. It is interesting to reflect that the sulphur imported into England becomes a source of nuisance in the shape of tank-waste, but passes through the various stages of sulphur dioxide, acid, sulphate of soda, tank waste and hydrogen sulphide, and finally appears at the end of the process as beautiful crystalline sulphur, a product of high commercial value.—*Am. Chem. Jour.*

IMPROVEMENTS IN THE MANUFACTURE OF ALUMINUM AND ITS ALLOYS.

In the process for the separation of aluminum and its alloys by electrolysis, invented by W. Diehl, of Berlin, a bath is prepared of the fluorides of alkali metals, or the compound fluorides of the alkali metals and anhydrous alum, a sulphate of an alkali and chloride of sodium. The substances are taken in the proportions given in the following equation, viz.:

$$7\ NaF + Al_2K_2(SO_4)_4 + x\ Na_2SO_4 = Al_2F_6\ 1\ NaF + 3\ Na_2SO_4 + K_2SO_4 + x\ Na_2SO_4$$

or

$$7\ Al_2F_6\ 6\ NaF + 5[Al_2K_2(SO_4)_4] + x\ Na_2SO_4 = 12\ Al_2F_6\ 1\ NaF + 5\ K_2SO_4 + 15\ Na_2SO_4 + x\ Na_2SO_4$$

and melted together in a crucible. When melted they are allowed to cool down, and are then ground and thoroughly washed in water to get rid of all traces of the sulphate. The fluoride thus formed will contain, for 1 mol. of aluminum fluoride, 1 mol. of alkaline fluoride, Al_2F_6 1 NaF. This compound fluoride is now melted with an alkaline chloride, *e. g.*, chloride of sodium, in proportion about the chemical equivalent of the aluminum fluoride, with as much fluor-spar as the molten mass will take up, and while in a molten state the mass is submitted to a current of electricity, aluminum being collected on the negative pole and chlorine liberated at the positive pole. In addition, a certain amount of alkali fluoride will be formed in the molten mass, as indicated in the following equation:

$$Al_2F_6NaF + 6\ NaCl = Al_2 + 17\ NaF + 6\ Cl.$$

This sodium fluoride, if melted with anhydrous alum, will form the double fluoride, Al_2F_6 1 NaF, and will be in a condition to be subjected to electrolysis, as before explained, after the mixture has been thoroughly washed and the alkaline chloride added thereto. In place of the anhydrous alum and aqueous solution of nitrate of aluminum, $Al_2(NO_3)_6$, may be used for the purpose of producing the compound fluoride of aluminum to be treated. The compound fluorides of aluminum and alkali may also be taken and melted with fluoride of barium, without any chloride. Thus:

$$Al_2F_6\ 6\ NaF + 3\ BaF_2 = Al_2 + 3\ BaF_2 + 6\ NaF + 6\ F.$$

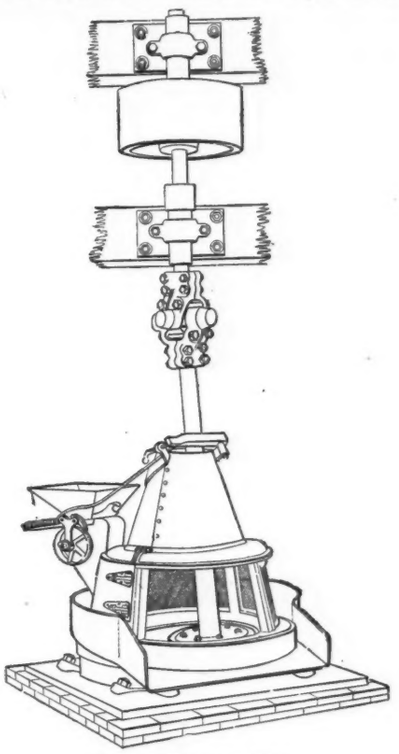
The various compounds obtained by the above means are subjected to the action of the electric current in a crucible heated in a furnace. When employing a retort carbon as cathode, the desired quality of the aluminum is not obtained, nor the desired output, as compared with the electric power expended; it is therefore preferable to produce, first, an alloy by an electrolytic process, from which the aluminum can be afterwards separated by means of commonly known processes. If either of the metals—iron, copper, cobalt or nickel—be employed as the cathode, the current must be so regulated that an alloy rich in aluminum shall be obtained from the cathode. This easily fusible alloy is separated by careful fusion into a crystalline alloy difficult of fusion and containing little aluminum, and a pure or nearly pure aluminum, comparatively easily fusible. This separation proceeds more effectually when it takes place in combination with certain salts which will not undergo chemical change, but only facilitate the separation: alkaline chlorides in union with alkaline nitrates; earthy alkali chlorides and alkali nitrates, etc.—*Jour. Soc. Chem. Ind.*

Terms on which Machinery is sold in Germany.—The general terms for the purchase of mining machinery in Germany are mainly as follows: Shipping and freight are subject to special agreement; the price is at the shop; one-third is payable on ordering, one-third on shipment of the bulk of the order from the shop, and one-third three months after the machinery is put up and in working order: at the latest, however, six months after the second installment, unless seller is responsible for delay, when the purchaser is entitled to a discount of, at most, one-half per cent. per week.

THE GRIFFIN ROLLER MILL.

This mill, designed for the pulverization of wet or dry ores, phosphates, cements, carbon and all hard and refractory substances, receives its motive power from the vertical shaft which runs in two self-adjusting journal bearings bolted to the timbers in the mill building or, independently of this, to a specially devised timber or iron frame. The step bearing which carries the weight of all the running parts, is fastened to the lower journal box and may be raised or lowered as the accurate adjustment of the working parts of the apparatus requires. A smoothly running universal joint connects the perpendicular shaft at its lower end with the roller shaft; to the latter is secured the cylindrical crushing roll, which on the revolution of the shaft moves freely about in a ring or die (weighing 260 pounds and encased in a base or pan) and by centrifugal force presses against the inner surface of the ring.

When the material to be pulverized, after crushing in a rock breaker to 1-inch cube, is introduced into the pan through an automatic feeder, it is stirred up by the 12 pound shoes or plows attached to the lower side of the roll, and then is thrown against the ring and crushed by the roll. When sufficiently fine the pulverized material passes through screens at the base. It is then carried off, in a special conveyer, through openings in the bottom of the pan outside of the screens. The screening arrangement operates so efficiently as to give passage to four tons an hour of phosphate rock, 90 per cent. of which would pass through a 60-mesh



GRIFFIN ROLLER MILL.

screen. A fan attached to the shaft above the roll and cased in with it, forces air through the screens into the discharge and keeps the dust within the mill.

For wet grinding, a trough is substituted for the openings in the bottom, and the fan is omitted, otherwise the construction is the same.

Owing to the continuous crushing of the roller, the total surface in active contact with the material to be reduced is very large. This presupposed effectiveness is confirmed by actual experience. The mill grinds from 1½ to 4 tons per hour at 150 to 175 revolutions per minute, according to the character of material, consuming about 20 horse-power, though an engine rated at 25 horse-power is preferable to one of nominal 20 horse-power. The even distribution of the material to be acted on, its quick discharge when finished, and the uniformity of the work as to fineness are indicated by the fact that 37 tons 400 pounds of Charleston phosphate rock were pulverized in nine hours, and, when sampled and tested with standard screens, showed 91.5 per cent. able to pass through a 60-mesh and 84 per cent. through an 80-mesh.

The mill occupies 4¾ square feet, weighs 6,000 pounds, and requires but little attendance. The repair is so slight that, in a certain case, 1,500 tons of Charleston rock were ground without causing a measurable wear, according to what the user of one of these mills states as his personal observation. The wearing parts, *i. e.*, the ring, the tire of the roll (weighing 100 pounds) and the shoes, are easily removed and replaced. The heaviest piece is the pan (2,400 pounds), which could be sectionalized. Outside of this no part weighs over 300 pounds. The journal bearings are several feet away from the mill, run cool and consume about half a pint of oil for ten hours. The vibration of the apparatus, when based on a good foundation, is light.

Considering the effectiveness of the Griffin mill, besides its additional advantages of requiring small attendance and of being simple in construction, with few crushing and wearing surfaces, and those easily replaced, comparatively slow motion (only 175 revolutions per minute), that none of the bearings are within the mill and are easily protected, and that the wear is slight, it is quite safe to predict for this mill a large share of favor among practical mill men.

RAPID VOLUMETRIC ESTIMATION OF SULPHUR IN BURNT PYRITES.

Written for the Engineering and Mining Journal by John Watson.

In 1888 a paper describing this method was read by Mr. John Watson, F. I. C., to the Newcastle section of the Society of Chemical Industry. The method then described has been examined since by Professor G. Lunge, of Zurich. As his report is highly favorable, we give a description of the method and of Professor Lunge's experiments, believing they will be of use to assayers and manufacturers of sulphuric acid.

Pelouze's method, as described in the text-books of quantitative analysis, consists in the heating of a weighed quantity of pyrites with weighed portion of sodium carbonate and potassium chlorate, the three having been intimately mixed in an iron spoon or platinum crucible. On allowing to cool, the mass is soaked with warm distilled water, the crucible is washed out, the residue boiled with water, filtered and washed until all soluble matter is removed; the filtrate is then titrated with standard acid. The volume of standard acid required for the soda originally used, minus the volume now required to neutralize, is calculated into percentage of sulphur present. This method is said to be tolerably accurate, the greatest variation from the truth being 1 or 1·5 per cent., with careful manipulation.

During the year 1879 it was found by Messrs. W. Russell and F. Scurfield, in the laboratory of the Newcastle Chemical Works, that for burnt pyrites, containing moderate quantities of sulphur, the use of potassium chlorate was not necessary, and that excess of sodium carbonate (or, what answers even better, sodium bicarbonate), mixed uniformly by stirring with the burnt pyrites, was sufficient to fix the sulphuric anhydride (from the oxidation of the sulphur of the pyrites over the Bunsen flame) as sodium sulphate. Bicarbonate of soda has been found to be constant in its alkalinity when kept in a dry stoppered bottle, even when this is opened daily for use.

On heating it splits up according to the well-known equation:

$$2NaHCO_3 = Na_2CO_3 + H_2O + CO_2$$

The use of potassium chlorate was considered objectionable, as the heated mass in the crucible requires stirring with a wire poker, and it was found that, owing to the vi cous condition of the mass part would always adhere to the end of the stirrer. It was also more difficult to wash out the mass from the crucible. A standard solution of hydrochloric acid was in use in the laboratory, of which 1 c. c. = ·50 grain soda, or ·258 grain sulphur. By weighing off 25 80 grains of a sample of burnt ore, and treating as hereafter described, one was enabled to read off percentages, and thus save calculation. The results by this volumetric method were checked by the ordinary gravimetric method by Mr. F. Scurfield in 1879. They were sufficiently near to warrant the use of the volumetric method for testing the daily samples, which, about that time, were greatly increased in number. Since then the method has been in daily use in the laboratory of the Newcastle Chemical Works.

Since 1886 they have been sending part of a sample to another chemist, who uses the gravimetric method, retaining part themselves and testing for soluble and total sulphur, exchanging results by posting on the same day. The results usually agree very well. For example:

TOTAL SULPHUR IN BURNT PYRITES SMALLS.

Gravimetric method.	Volumetric method.	Taking gravimetric estimation as standard.	
		Difference.	Difference per cent. sulphur present.
2·50	2·44	— ·06	— 2·40
2·63	2·52	— ·11	— 4·18
2·44	2·40	— ·04	— 1·64
2·04	2·02	— ·02	— 0·98
2·19	2·22	+ ·03	+ 1·37
Average 2·36	2·32	— ·04	— 1·57

The above is a fair sample of their weekly tests. In a few exceptional cases the difference has been as high as ·40 per cent., but on repeating tests and investigating the matter such differences were oftener found to be the fault of the manipulator than of the method.

When the author commenced comparing results with the other chemist, he diluted his standard hydrochloric acid two and a half times, making 1 c. c. = ·20 grain Na_2O; he also took twice the former quantity of burnt ore, viz., 51·60 grains. His object in making these two changes was to get a more accurate reading, any error being now divided by five, as division by this number was necessary to read percentages. He could read the burette to ·05 c.c.; thus there was never a remainder beyond the second decimal figure on dividing.

ESTIMATION OF TOTAL SULPHUR.

The following is the method now in use for the estimation of total sulphur, describing those details found by practice to be important:

Place 20 grains of bicarbonate of soda, of known alkalinity, in a nickel porcelain or platinum crucible; to this add 51·60 grains of the powdered sample of burnt ore and mix uniformly with a glass stirring rod, which has been flattened out at the end in a transverse direction by fusion and pressure. Now, place the crucible and contents over a rather low Bunsen flame and heat gently for five to ten minutes, when the mass must be broken up with the end of a wire stirrer, taking care that none is spilt.

The gentle heating serves to drive off a molecule of CO_2 from the bicarbonate and prevents the too hard caking of the mixture, which takes place when a rather high proportion of sulphur is present. The stirring opens out the mass and does not allow a kernel of unoxidized sulphur to remain. A convenient form of stirrer for this purpose may be made of copper wire, with a wooden handle.

After stirring, the heating must be increased and continued for 10 or 15 minutes, when the oxidation should be complete; then wash out with warm water into a beaker (No. 5 or 6).

In the case of iron pyrites the oxidation process may probably be represented by the following equation:

$$2FeS_2 + 15O + 4Na_2CO_3 = Fe_2O_3 + 4Na_2SO_4 + 4CO_2.$$

In works where a large number of samples are to be tested a combustion furnace is very convenient, as a long row of crucibles can be ignited, containing the portions for total sulphur, whilst the portions for soluble sulphur are being boiled over single Bunsens. After washing contents out of the crucibles, rinse with moderately hot water from a wash-bottle, also using a glass rod covered at the end with india-rubber tubing. Add hot water to the beaker, and boil for 15 minutes over a Bunsen flame, then filter through an ordinary filter paper into a 20-ounce flask; wash four or five times with hot distilled water, add a few drops of methyl orange as indicator, and titrate with standard hydrochloric acid solution (1 c. c. = ·20 gram Na_2O). Suppose 20 grains of the bicarbonate originally required 37·50 c c. acid, and that we now require 28 00 c. c., deducting this and dividing the difference by 5, we get the percentage of total sulphur, which, in the case assumed, would be 1·90 per cent.

Where gram weights are used, a convenient strength of standard solution would be 1 c. c. = ·020 gram Na_2O = ·0103 gram S.; 2·00 grams bicarbonate and 5·16 grams burnt ore could be weighed. Thinking that the sulphur contained in coal gas might cause an error, the author first determined the sulphuric acid in the bicarbonate, then heated two portions (of 50 grains each) of the same over double Bunsen flames, turned on full, for 30 minutes. The gain of sulphuric acid in each portion was only equal to ·010 grain sulphur = ·02 Na_2O, or ·1 c. c. of their standard acid. The gas used was that of the Newcastle & Gateshead Gas Company. This error may, he thinks, for practical purposes, be neglected.

ESTIMATION OF SOLUBLE OR UNAVAILABLE SULPHUR.

It is often useful to a sulphuric acid manufacturer to know what proportion of the residual sulphur in burnt ore exists as sulphide which should have been available for acid making with perfect combustion. This knowledge can be indicated with sufficient accuracy for working purposes by estimating the soluble sulphur and deducting this from the total sulphur estimated by the volumetric method just described. The difference is the insoluble or available sulphur which will exist as sulphide.

A convenient method of estimating the soluble sulphur is by boiling a weighed quantity of burnt ore with a known quantity of standard solution of sodium carbonate. In this process the changes are probably represented by the following:

$$2FeSO_4 + 2Na_2CO_3 + 3H_2O + O \text{ (from air)} = Fe_2(HO)_6 + 2Na_2SO_4 + 2CO_2 2CuSO_4 + 2Na_2CO_3 + 2H_2O = CuCO_3Cu(HO)_2.H_2O + 2Na_2SO_4 + CO_2$$

On boiling:

$$3(CuCO_3 + Cu(OH)_2 + H_2O) = 2Cu(OH)_2 + 4CuO + 3CO_2 + 4H_2O.$$

$$CaSO_4 + Na_2CO_3 = CaCO_3 + Na_2SO_4$$

After boiling, filter, wash and titrate the filtrate with standard acid. Then weigh out 51·60 grains of burnt ore into a beaker, add 5 c.c. of solution of sodium carbonate (1 c.c. = ·50 grain Na_2O), dilute with hot distilled water, boil for 15 minutes, filter into a flask, wash the insoluble residue three or four times with hot water, and titrate the filtrate with standard acid.

$$\frac{\text{C.c.s. acid originally required for 5 c.c. soda solution} - \text{ccs. now used}}{5}$$

= per cent. soluble sulphur present.

The author had recently tested two samples of burnt pyrites (Mason's dust) by the volumetric methods here described, also by the gravimetric method, the total sulphur being estimated as described in Lunge & Hurter's "Alkali-maker's Handbook," the soluble by boiling with dilute hydrochloric acid (strong hydrochloric acid P.B.: 4 water) for 15 minutes.

The tests were all done in duplicate, with the following results:

METHOD.	SOLUBLE SULPHUR.		TOTAL SULPHUR.	
	Volumetric.	Gravimetric.	Volumetric.	Gravimetric.
SAMPLE B_2.				
Test I.	1·12	1·19	1·31	1·41
" II.	1·12	1·12	1·42	1·36
Mean	1·12	1·15	1·36	1·38
Difference	— ·03	—	— ·02	—
Difference per cent. sulphur	—2·60	—	—1·45	—
SAMPLE C_1.				
Test I.	1·04	1·15	1·42	1·53
" II.	1·04	1·10	1·44	1·55
Mean	1·04	1·12	1·43	1·54
Difference	— ·08	—	— ·11	—
Difference per cent. sulphur	—7·14	—	—7·14	—

These results, though not sufficiently close for strictly scientific work, will probably be considered accurate enough by works managers, for whom this method is essentially of use.

In a communication to the *Journal of the Society of Chemical Industry* in 1885 (see p. 449), Prof G. Lunge writes: "My reason for rejecting any dry process for the estimation of sulphur in pyrites is that in this way we estimate also the sulphur of galena (which is nearly always present) and of the sulphates of barium and calcium, none of which are of the least use to the consumers of pyrites, whilst in the wet process nearly the whole of that useless sulphur is left behind in the insoluble residue." This objection may apply in the case of green ore containing appreciable quantities of the above constituents, but does not apply to any considerable extent, so long as Mason's pyrites is used, because:

1. Out of three analyses of their burnt ore (Mason's), only one showed an estimable quantity of lead, viz., PbO, ·50 per cent.; and assuming this lead to exist as PbS, we should have PbS ·535 per cent. containing only ·071 S per cent., a quantity too small to make a practical difference.

2. Calcium sulphate is decomposed on boiling with sodium carbonate, and, according to the experiments which the author made, by boiling mixtures of burnt ore with 1 per cent. and 2 per cent. calcium sulphate (specially prepared), it was found that 97·4 per cent. and 96·3 per cent. (respectively), of the sulphur of calcium sulphate was estimated by the method given for soluble, or unavailable, sulphur.

3. Regarding barium sulphate, they had never found appreciable quan-

tities of this in analyzing pyrites, though the author had seen occasional lumps of a mineral very like heavy spar among Mason's pyrites smalls.

Probably the best proof that the above objections of Professor Lunge do not apply to their method of testing burnt pyrites is that the difference between the total sulphur estimated weekly by them and that got by another chemist, using the gravimetric method, was only ·04 per cent. more sulphur by the volumetric method over a period of 28 weeks.

In large works, especially where shelf burners are in use, foremen and managers sometimes wish to know in a short space of time how a set of burners is working. Under such conditions they found, at the Newcastle Chemical Works, the above method to be the only one available. The author had weighed, treated, and tested a sample of burnt ore (and sometimes more than one) for soluble and total sulphur, within an hour, the result being afterward confirmed by the barium method. In addition to its rapidity, the method may be commended for the absence of acid fumes. It has been in daily use at the Newcastle Chemical Works for about nine years, and during that time has been introduced into other works, where it appears to displace the gravimetric method for estimating sulphur in burnt ore.

For green ore it is not a satisfactory method, though various modifications had been tried.

We now give a translation of Professor Lunge's paper, "On the estimation of sulphur in burnt pyrites, and in analogous cases," which appeared in the *Zeitschrift für angewandte Chemie* (Berlin), for 1st May, 1889: "Whilst for the estimation of sulphur in fresh pyrites the wet method is now pretty generally employed, using a mixture of three parts nitric acid to one part hydrochloric acid, as described in the "Pocket-book for Alkali-makers," p. 90, there exists much less uniformity with regard to the examination of the burnt ore. In the same book (p. 94) there is also described for this purpose the method by aqua regia, and the gravimetric estimation of the sulphur by means of barium chloride; but many manufacturers desire to use here, where the most minute exactness is not important, a more rapid method, such as can only be achieved by volumetric analysis."

One of the oldest methods of this kind is that by Pelouze, which Dr. Lunge describes; then he says: Pelouze intended even to apply this method to the estimation of sulphur in fresh pyrites, for which purpose one had only, with a view to moderate the reaction, to add sodium chloride. However, the said method is not at all applicable for this purpose; even with great precaution one can scarcely prevent the spurting of small particles of the mixture on heating; there also exist faults of principle, and the results always turn out too low.

Dr. Lunge and a number of other chemists, particularly Kolb, have settled this point already, many years ago (Comp. Fresenius Quant. Anal., 6th, ed.)

The former once more has caused some experiments to be made in this direction (by Mr. H. Rey), but with equally unfavorable result.

A very pure pyrites, which, analyzed by the aqua regia method, showed 52·02 to 51·98 per cent. sulphur, in two experiments, yielded by Pelouze's method, in spite of the most careful execution, only 49·21 to 49·50 per cent.

Thus, this method is at any rate of no use for fresh pyrites, even if one were to add, according to Pelouze, 1 to 1½ per cent. for "constant error." Nevertheless, it seemed worth while to further examine it for burnt ore, where possibly the ballast of oxide of iron would moderate and make smoother the reaction. Into the experiment were further drawn the methods of Kolb (*J. Pharm. Chem.*, IV. 10,401); Fresenius (at the same place, p. 463) and of Watson (*J. Soc. Chem. Ind.*, 1888, pp. 305, 729 and 730).

Kolb heats 5 to 10 grams burnt pyrites with 50 grams copper oxide and 5 grams sodium carbonate, whereby no melting or flying off occurs, and whereby, in view of the proportionately low temperature of reaction, no acting of the acid silicate upon soda need be feared. For about 15 minutes one heats the mixture in an iron basin at a dull red temperature, stirring occasionally, then washes out with water and titrate. This method, as compared with Pelouze's, has the obvious advantage that no loss from flying about of particles occurs. But one must not heat too long, because then the formation of silicate would occur and the results turn out too high. The boiling and washing of the large quantity of oxides of copper and iron is troublesome and wastes time, and finally the method is also somewhat expensive, inasmuch as it requires for every experiment 50 grams copper oxide.

The method of J. Watson is next described by Dr. Lunge; this we need not repeat, having given that author's description in the early part of this paper. Dr. Lunge comments on Watson's method: On account of the small quantity, the washing can be done easily and quickly; the carbonic acid which escapes from the bicarbonate keeps the substance porous, and no flying about, whatever, of the same takes place.

The following experiments for comparison were conducted partly by Mr. A. Likiernik and partly by Mr. H. Rey. The basis formed three different samples of burnt ore, whose contents of sulphur were determined on the one part by the exact gravimetric method with aqua regia, partly also in the dry way by melting with soda and potassium nitrate and on the other part by the methods of Pelouze, Kolb and Watson.

GATESHEAD-ON TYNE, ENGTAND.

SAMPLE I.

By Gravimetric Analysis.

a. With aqua regia (Likiernik.)	b. With niter and soda. (Likiernik.)	c. After Pelouze. (Likiernik.)	d. After Kolb. (Likiernik.)	e. After Watson. (Rey.)
4·69 4·65	4·80 4·72	3·37 3·66 3·71	3·36 3·25 3·21 3·40 3·17 3·23 (Rey.) 3·20 3·40	4·59 4·51

SAMPLE II.

(*Likiernik.*)

a. With aqua regia	b. After Pelouze.	c. After Kolb.	d. After Watson.
·33 ·35	·14 ·21	·19 ·26	·30 ·36

SAMPLE III.

(*Likiernik.*)

1·09 1·13	·84 1·05	1·09 ·59 ·65	·99 ·90 1·06 1·02

The conclusion to be drawn from this, says Dr. Lunge, is as easy as it is safe. Of all examined methods, that of Watson is not alone the only exact one, but it is also the simplest, the most rapid and cheapest, and can therefore in every respect be recommended, before all others, for the estimation of sulphur in burnt pyrites and in similar cases.

A Magnet for Extracting Particles of Metal from the Body.—In machine shops it is a frequent occurrence that particles of metal penetrate in the skin and eyes. Messrs. Frister and Rossman have, according to *Revue Industrielle*, constructed a magnet for the special purpose of extracting such particles. It is horse-shoe-shaped, polished and nickel-plated; the two branches are rounded off and end in a point only a few millimeters thick. Its attraction for iron extends for several millimeters.

The Largest Barometer yet made has just been put in working order in the Saint Jacques tower in Paris, France. It is 12·65 meters high, was manufactured in St. Denis, and was carried by six men to Paris in a strong wooden frame. The room where it is placed is 40 meters high. The diameter of the tube is 2 centimeters. It is filled with colored water topped off by a layer of dense oil as a protection against evaporation. The two other gigantic barometers erected, one in Kiew, 1870, by Jordan, and one in 1886, in New York, by Millo, were filled with glycerine.

Filtering Muddy Water.—The Stadtberger Mining and Milling Company, at Niedermarsberg, Brilon, had for some time been annoyed by the muddy waste-water from its works when it introduced an apparatus made by L. G. Dehne, of Halle a. d. Saale, to separate the solid parts from the water. This apparatus consists of a suction pump, on which is attached a safety valve permitting the pressure to be raised to eight atmospheres. The muddy mass is pumped into the filter and passes through its 50 chambers. In 24 hours about three tons of solid parts are filtered from about 15,800 gallons. The apparatus has been in operation since October, 1888, and proved so satisfactory that the company is going to put up a second.

Singkep, the New Tin Island in East India.—The Singkep Tin Company, concessionaire of the island of Singkep, has raised its capital from 1,250,000 to 1,500,000 guilders—say, £125,000—to ensure the regular working of the tin mines. Singkep promises to become a formidable rival to its great tin-producing neighbors, Banca and Blitong. Its size is about 50,000 hectares—say, 123,550 acres—and it belongs to the Lingga Islands, a group off the east coast of Sumatra, and formerly belonging to Johore and Malacca. The tin mines of Singkep are supposed to be of great antiquity. They were hitherto worked by the native Sultan, who is a vassal of Holland. He exported the ore to Muntok, the capital of Banca, or to Singapore, but Singkep tin was not known by itself in the European market, being sold for Banca or Blitong.

Electrical Engineering at Columbia College.—The new buildings erected for the accommodation of the electrical school, Columbia College, in this city, contain a number of interesting features. The facilities for obtaining electric currents of different kinds and in large quantities are reported as being highly satisfactory. By connecting with one of the commercial stations it is possible to secure uninterrupted currents for experimental work, which it would be inconvenient to do with the plant at the school. In all the rooms continuous currents of 100 ampères and 110 or 220 volts are supplied, besides which are two other special 100-ampère circuits and a low voltage storage battery circuit for testing purposes. The tables for supporting instruments are well protected against jarring. A battery of 1,280 cells has recently been made by the students, which, with Daniell elements, gives 1,400 volts, or, set up as a storage battery, 2,800 volts. This is being used for experimental purposes in the laboratory. The plant of dynamos, motors and instruments is very complete.

Phosphate Lands are Classed as Mineral Lands by the Government.—The register and receiver of Grainesville, Fla., in a letter of 15th October, 1889, asked the Department in Washington if lands containing phosphate came within the law relating to mineral lands. The Department replied on December 11th, 1889, that non-metallic mineral substances generally are classed as mineral; but, in the absence of any specific ruling as to phosphate, and because of regard due to the bona fide claimants under the homestead and pre-emption laws where the patents had not issued, Commissioner Groff directed a full report to be sent him and meanwhile the receipt of mining applications for phosphate claims to be suspended. The register reported, December 20th, 1889, that the phosphate found in Marion and Citrus counties is of the highest quality, that the lands which must be surveyed in order to ascertain the quantity are more valuable for these deposits than for other purposes, and that the phosphate can be marketed at a fair profit. In reply to this report the commissioner rules, April 15th, 1890, that phosphate, included in "all valuable mineral deposits" in section 2319 Rev. Stat., "is subject to disposal under the mining laws as mineral land."

Electric Light from Gas Engines.—A highly interesting fact has been brought out by Mr. O. Tirrill, of 39 Dey street, New York, in some practical tests in producing electric light by using illuminating gas for driving a gas engine and a Perret dynamo. Naturally one would suppose that the loss due to the double transformation of energy in producing the electric light from illuminating gas by this means would place the cost of the electric light far above that of gas. On the contrary, however, Mr. Tirrill has found to his surprise that a given amount of gas will produce far greater illuminating effects when used to drive this dynamo than when burned direct. The gasolene gas is produced by his machine for $1 per 1,000 feet. The engine, it is found, consumes four feet of this gas per 16 candle power lamp per hour when driving the dynamo under full load, making the cost per lamp two-fifths of a cent per hour, so that the luxury of the electric light by this means, instead of being expensive, he finds in reality to be a great economy. Mr. Tirrill explains the phenomenon by the fact that his gasolene gas contains 80 per cent. of air when delivered at the explosion chamber of the engine, and he gets the benefit of the expansion of this large volume of air by the heat of the explosion.

Increase of Temperature in Deep Boreholes.*—The greatest depth reached until 1883 was 1,070·2 meters (3,478 feet) in the shaft at Pribram, Bohemia. This has since been exceeded in the following seven cases: Friedrichsane at Aschersleben, 1,080·22; Inowrazlaw, 1,104·65; Sennewitz at Halle, 1,111·45; Lübtheen in Mecklenburg, 1,203·70; Sperenberg, near Berlin, 1,273·01; Lieth, near Altona, 1,338·00, and Schladebach, 1,748·40 meters. The increase in temperature which according to previous observations was about one degree C. per 39¼ meters (one degree Fahr. per 71 feet) averaged for an increase of one degree C., at Sperenberg, 32 meters; at Sudenburg, 32·36; at Lieth, 35·07; at Sennewitz, 36·66, and at Schladebach, 36·87. In the last borehole, at a depth of 1,716 meters, almost the highest temperature observed in the interior of the earth was recorded, namely, 45·3 degrees R. (1·35 degrees Fahr.); but the increase was uneven in consequence of the different heat-conducting qualities of clay, limestone, sandstone, rock salt, etc., and also because of the influence of the water from springs of various temperatures encountered during the boring, besides the artificial effects of the drilling work. The observations at Schladebach are the most reliable, particularly those bearing on the deepest points, because they followed the work in its progress and were made in a borehole with no tubing. At a depth of from 1,266 to 1,716 meters the temperature rose one degree C. for 39·55 meters. The difference between this figure and 31·40 meters, previously considered normal, is so great as to necessitate further observations.

Mexican Mint Reports.—The treasury department has just published the statement of the coin that has been minted in the republic for the first half of the fiscal year 1889-90, which is as follows:

Mint.	Silver.	Gold.	Copper.
Alamos	$ 174 300	$ 8,220	$ .....
Culiacan	521,287	22,240	.....
Chihuahua	1,437,245	9,280	.....
Durango	422,134.50	.....	.....
Guadalajara	885,804.70	.....	.....
Guanajuato	1,725,590	8,840	.....
Hermosillo	169,985	.....	.....
Mexico	4,006,300	67,320	84,695.25
Oaxaca	59,200	.....	.....
S. Luis Potosi	1,027,740	.....	.....
Zacatecas	2,099,000	22,857	.....
Totals	$12,518,496.20	$138, 757	$84,695.25

Making a grand total of $12,741,948.45.

In a comparative table that follows it is observed that there has been a falling off in coinage of both gold and silver in the first half of the fiscal year of 1889-90 in comparison with that of the fiscal year of 1888-89. In the first half of the fiscal year 1888-89 the silver coined amounted to $13,254,991.95 or $736,495.75 more than in the first half fiscal year 1889-90. The gold coined in the same period 1888-89 amounted to $153,822 or $15,065 more than in same period 1889-90. Copper coinage shows an increase in the first half of 1889-90 over same period 1888-89 of $69,851. The total difference in favor of the first half of the fiscal year 1888-89, gold, silver and copper considered, is $681,709.39.

Aluminum for Engineers' Instruments.—The lightness of aluminum and its resistance to corrosion by the atmosphere and moisture make its adoption in the construction of portable instruments of precision a desideratum. We take the following particulars from a note by Prof. William P. Blake, read before the American Institute of Mining Engineers. The Keuffel & Esser Company, of New York, has made sextants of aluminum which so far have proved satisfactory, and is now engaged on a mining transit, some parts of which, however, are of a harder and heavier metal. Messrs. Fauth & Co., of Washington, have already made a mining transit of aluminum. Perhaps the most interesting instance of the use of this metal for portable instruments is the double reflecting and repeating circle invented by Capt. Charles H. Townshend, of New Haven, and made by Messrs. Stackpole & Bro., of New York. The instrument is intended for use in a boat and to be held in one hand, and weighs, exclusive of the eye-pieces and the handle, only one pound, or about one-third of an ordinary sextant. The circle is about 9 inches in diameter and was cast in one piece from metal furnished by the Pittsburgh Reduction Company. The castings are homogeneous, free from blow-holes and dress up clean and sharp. The metal works well under the file, in the lathe, and under the graduating tool. Every part has also apparently the requisite rigidity under the touch. The drawbacks to the use of aluminum are that it is apt to tear under the tool, being rather soft and "spongy," and that it does not give clean threads. The latter difficulty is overcome by a careful use of the tap and die. In regard to the former a small quantity of silver added to it increases its hardness considerably. The alloy chosen by Mr. Hunt consists of 95 parts of aluminum by weight and 5 parts of silver, and is much more rigid, and but little heavier than pure aluminum. This works better under tools, has a specific gravity of about 3.2, that of aluminum being 2.6, is whiter than the pure metal, almost as resistant to corrosion, polishes well and is better for graduation.

*Abstr. from a paper by Dr. A. Huyssen in *Berg u. Huttenm. Ztg.*

GEMS AND PRECIOUS STONES.

The *American Lithographer and Printer*, of New York, in its issue of the 10th instant, says: "Gems and Precious Stones of North America" is a work which contains 332 pages of most interesting reading about gems and precious stones from a scientific, archæological and commercial standpoint. The most pominent features of the publication are the color plates by L. Prang & Co., fine art publishers, Boston, Mass. They are by all means the best chromo-lithographic work we have ever seen. Their execution and accuracy in the smallest details give the gems an appearance of reality that is really surprising. We need not say that neither time nor color plates have been spared to bring the plates to such a perfection. Considerable trouble it would cost, and the thorough judgment of an authority would be required, to count the number of colors that have been used for these plates and to tell how many times they passed through the press. Although we have always considered L. Prang & Co. as standing in the highest rank of lithographic art publishers in the world, we have up to the present time not seen any work which could be compared to these plates.

The Baltimore *American* of the 9th inst. says: "Gems and Precious Stones in North America"--a work of this kind has long been needed, and few persons are so well qualified to undertake it as Mr. Kunz; it is not only one of great value to dealers, but to all who are interested generally. There are eight beautiful colored plates and numerous minor engravings, which add largely to the beauty and interest of the work. In the sixteen chapters comprising the work the author has set forth all the details of character, qualities, value, formation, etc., of all stones of note, the diamond, corundum, sapphire, ruby, turquoise, topaz and tourmaline, garnet, beryl; and after reading a work of this kind one has an intelligent acquaintance with their various characteristics, which adds new interest to their study.

Undoubtedly, Mr. Kunz's memoir will do much to excite interest in the development of the precious stones of the United States, and by stimulating the search for valuable gems should lead to important results when accurate information of the kind given in the present work becomes accessible to the public in its present convenient form. The lack of proper development in this branch of study has allowed many mistakes, deceptions and exaggerations to pass current, and it is certain that important finds have been overlooked and specimens thrown away as valueless, or even destroyed by false tests made in ignorance. This it is the author's object to avoid, and he has left no means untried by which his work may be made one of the greatest of its kind ever published, and with its store of valuable information, beautiful illustrations, and tasty, substantial binding, the work is one which forms a most desirable addition to any library.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office.

PATENTS GRANTED TUESDAY, MAY 20TH, 1890.

428,068. Railway Car. John A. Brill, Philadelphia, Pa.
428,071. Insulator for Electric Railway Wires. Harold P. Brown, New York, N. Y.
428,072. Trolley System for Electric Railways. Harold P. Brown, New York, N. Y.
428,073. Communator Brush for Dynamos. Lewis Van Brown, Asheville, N. C., assignor of one-half to William H. Inloes, same place.
428,076. Pipe Coupling. Andrew Cochran, Trenton, N. J.
428,097. Roasting Hearth Attachment for Operating Stirrers. Isaac B. Hammond, Chicago, Ill.
429,098. Electric Railway. Rudolph M. Hunter, Philadelphia, Pa., Assignor, by mesne assignments, to the Thomson-Houston Electric Company, Boston, Mass.
428,106. Steam Engine. Enos. H. Johnson, Chicago, Ill.
428,108. Hoisting Machine. Alfred T. Kellher, Bethel, Me.
428,114. Welding Compound Arthur D. Le Roy and Charles A. Lowell, Cortland, N. Y.
428,118, 428,119. Car-Coupling. James N. Martin and William H. Harris, Newberry, S. C.
428,120. Steam Air Pump. Albert P Massey, Watertown, N. Y.
428,121. Apparatus for Manufacturing Salt. Alexander Miller, New York, N. Y., Assignor of one-half to Robert Deely, same place
428,130. Belt Fastener. Henry G. Parsons and William A. Brown, New Britain, Conn.
428,135. Oil Feeder. Robert B. Price, St. John, New Brunswick, Canada.
428,136. Trolley Arm Support for Electric Railways. Frank B. Rae, Detroit, Mich., Assignor to the Detroit Electrical Works, same place.
428,141. Dredging Machine. Arthur W. Robinson, Bucyrus, O.
428,149. Lead Lined Digester. Sidney Smith, Cambridge, Mass.
428,186. Flexible Pipe Connection. Herman Vering, Hamburg, Germany.
428,235. Coal Car. Edward E. Steinhilber, Galesburg, Ill.
428,237. Gas Producer. William J. Taylor, Chester, Assignor to the Taylor Gas Producer Company, Camden, N. J.
428,251. Apparatus for Reducing Bituminous Rock, &c. Joseph B. Jardine, San Francisco, Cal.
428,282. Process of Manufacturing Salt. Alexander Miller, New York, N. Y., Assignor of one-half to Robert Deely, same place.
428,284. Feed Mechanism for Woodworking machines. Charles J. Olson, Chicago, Ill., Assignor of one-half to Charles Larsen, same place.
428,346. Ore Feeder. George C. Mueller, St. Louis, Mo.
428,347. Car Coupling. James Mutton, Frisco, Utah.
428,353. Apparatus for Burning Hydrocarbon Oils. Ethan Rogers, Ballston, N. Y.
428,355. Car Coupling. James F. Shannon, Macomb, Ill., Assignor of one-half to Adolphus W. Falkenthal, same place.
428,378. Electric Furnace for Melting Metals. Edward A. Coloy, New Haven, Conn.
428,389. Car Coupling. John A. Frenzel, Wausau, Wis.
428,399. Apparatus for Separating Liquids from Natural Gas. William Moore, Kokomo, Ind.
428,400. Anti-Friction Journal, Journal Box and Bearing. James P. Morell, Camden, N. J.
428,430. Hoisting Machine. Henry B. Tefft, Milwaukee, Wis., Assignor of one-half by mesne assignments, to the Moore Manufacturing and Foundry Company, same place.
428,441. Crucible Furnace. Jose B. Alzugaray, Oporto, Portugal.
428,445. Compound for Converting Iron into Steel by Cementation. Francis G. Bates, Philadelphia, Pa.
428,446. Method of Manufacturing Steel. Francis G. Bates, Philadelphia, Pa., Assignor to the Bates Steel Company, same place.
428,456. Apparatus for Compressing Air or other Gases. Edward F. Clarke, Walsall, England.
428,459. Process of Welding Metals Electrically. Charles L. Coffin, Detroit, Mich.
428,461. Rig for Drilling Wells. George Corbett, Bradford, Pa.
428,466. Device for Removing Coke from Ovens. William H. Dinsmore, Connellsville, Pa.
428,551. Truck for Mining Machines. Edwin E. Carter, Pittsburgh, Pa., Assignor to John S. Scully, same place.
428,552. Process of Melting, Refining and Casting Metals. Edward A. Colby, New Haven, Conn.
428,558. Combined Ladle and Mold for Lead Hammers. Charles H. Field, Jr., Providence, R. I.
428,566. Treatment of Metallic Precipitates. Ebenezer K. Mitting, Chicago, Ill., Assignor to James S. Kirk & Co., same place, and Albert Domeier, London England.

PERSONALS.

We have a letter at this office for Mr. George A. Treadwill.

Mr. Thomas H. White, of Deadwood, Dak., has been appointed special agent of the census department of mines and mining for the collection of gold and silver statistics.

Mr. Edgar P. Rathbone, mining engineer, and until recently connecten with the firm of Bain bridge Seymour & Rathbone, engineers of London, has established an office at Johannesburg, S. A. R.

Mr. W. H. Reinert, who has been connected with the *Exchange Mining Journal*, of Denver, Colo., for some time in the capacity of a reporter, has been appointed managing editor of that paper and assumed charge of affairs.

Mr. E. F. C. Davis has resigned the position of Mechanical Engineer with the Pennsylvania and Reading Coal and Iron Company. He has been appointed General Manager with the Richmond Locomotive and Machine Works, at Richmond, Va.

Professor Hayes, Chief Geologist of the Agricultural Department and one of a corps of scientists who are exploring the arid region with a view to determine from the geological conditions the practicability of deep artesian well boring, visited Miles City, Mont., lately.

Suit has been entered in the United States Circuit Court in Pittsburg, Pa., by Fayette Brown, receiver of Brown, Bonnell & Co., of Youngstown, O., against J. W. Moore, the ex-coke operator. A contract made with the latter to furnish coke from May, 1889, to January 1st, 1890, at $1 a ton up to September 1st, and from that time to January 1st, at $1.10 a ton, was not carried out by Moore, and the plaintiff sues to recover the difference between the contract price with Moore and what he had to pay, making the amount $4,237.

Richard P. Rothwell, editor of the ENGINEERING AND MINING JOURNAL, will shortly make a trip through all the Western States and territories, going by Colorado, New Mexico, Arizona, California, and returning by the Northern and Central routes. Those wishing to secure his professional services in any part of the West should communicate with him at as early a date as possible.

OBITUARY.

Frank A. Leers, member of the American Society of Civil Engineers, died on the 19th inst. at Paterson, N. J.

David S. Cofrode, a leading contractor and builder of Philadelphia, Pa., died in that city on the 18th inst., aged 44 years. When a young man Mr. Cofrode learned bridge-building with the firm of Cofrode & Saylor, for whom he was foreman for about fifteen years. He did a great deal of work for the Pennsylvania Railroad, and has recently engaged in large contracts with the Erie road. At the time of his decease he was the owner of one of the largest lots of pile-driving machinery owned by a single operator in the country.

H. R. Harvey, a well-known mining expert of Duluth, Minn., died on the 13th inst., in Chicago, Ill. Mr. Harvey was the discoverer of the mining country in Northern Minnesota. Eight years ago he went on a prospecting tour in that region and located the Chandler mine at Ely. Other mines located by him were the Zenith and the Pioneer. For a time Mr. Harvey assisted in developing these properties, but increasing ill health soon debarred him from pushing the work as an explorer. Mr. Harvey was only 44 years old at the time of his death.

Calvin Tompkins died at his home at Tompkins Cove, on the Hudson river, on the 18th inst., in his 98th year. Heart failure was the immediate cause of his death. Mr. Tompkins was born at Orange, N. J. In his early life he conducted and finally owned the line of packet boats which in those days carried most of the freight between Newark, N. J., and New York City. During the war of 1812 he entered the military service of the United States, and was honorably discharged when peace was declared. At the time of his death he drew his veteran's pension from the government. When coal from the Pennsylvania fields was made accessible at tide water by the canals constructed to these fields, he for a long time controlled its distribution at Newark, and at this time laid the foundation of his fortune.

INDUSTRIAL NOTES.

A syndicate composed of Governor Fleming and Colonel R. P. Chew, of West Virginia; M. E. Ingalls, of the C. & O. Road; General C. H. Smith, of New York, and F. Osborne, of Pittsburg, it is reported completed a deal on the 17th inst. for 5,000 acres of land near Goshen, Va., on the C. & O. Railroad. The company proposes to build rolling mills, furnaces and car-building shops.

The Berlin Iron Bridge Company, of East Berlin, Conn., advise us that the new machine shop of the Link Belt Machinery Company, at Chicago, Ill., will be of iron, designed and built by them. The building will be 121 feet wide. The central portion will be 40 feet wide by 42 feet high, with a traveling crane running the entire length. The wings will be 40 feet in width and two stories high. A hydraulic crane will cover the entire central portion of the building except for a distance of 30 feet from one end, which will be used for offices.

The Iron Car Company, Huntington, Pa., assigned last week, owing to its inability to meet matured paper. At a meeting of creditors on the 12th inst., claims amounting to $600,000 being represented, steps were taken to reorganize the company, and a committee, composed of the following houses, was appointed to conclude the negotiations: Harrisburg Car Company, Conshohocken Tube Company, Brady Metal Company, Troy Malleable Iron Company, and J. G. Johnson & Co. The liabilities are said to amount to about one and a half millions.

The Diamond Prospecting Company, of Chicago, has found it necessary to secure more room for its stock of machinery and more machine shop space. On this account it has moved to 15 and 17 North Clinton street, where it has in stock Sullivan diamond drills of capacities from 300 to 4,000 feet in depth; a complete stock of diamond drill parts, rods and casing; also a large and carefully selected stock of carbon (black diamonds). The company also carry Sullivan steel channeling machines and repair parts and supplies for same; steam pumps and special mining supplies. The machine shop is fully equipped to turn out first-class work.

The United States Mint recently contracted with Henry Treemner, of Philadelphia, Pa., for a balance for weighing gold and silver coin, which is of remarkable size and capacity. The balance has just been completed and placed in position at the mint, where it gives most excellent satisfaction. The beam measures 72 inches long, and is of the finest workmanship. It will carry a load of 10,000 ounces (about 1,400 pounds) in each pan, and with that load indicates the wonderful sensibility of the 100th of an ounce. During a year's time millions of dollars worth of gold and silver is weighed upon this balance, hence its value cannot be underestimated in drawing a hair line between the buyer and the seller. It is probably the largest balance of its kind in the world.

The purchase by an English syndicate of a number of sewer pipe works of the vicinity of Toronto, it is stated, was consummated last week. In most of the cases the old owners will still retain an interest, and the factories will be run as before under their management. The purchase includes, according to reports, nine establishments—the Pennsylvania Manufacturing, Mining and Supply Company, Great Western Fire Clay Company, and John France, Sons & Co., all of Toronto; the Freeman Fire Clay Company, of Freeman's; the Empire Fire Clay Company, of Empire; McMahon, Porter & Co., of Blackhorse, W. Va.; John Lythe & Sons, of Wellsborough; the Columbus Sewer Pipe Company, of Columbus, Ohio; Knowles, Taylor & Anderson, of East Liverpool. The price paid is understood to be a good one. The capital of the syndicate is between two and three million dollars.

The recent decision of the Pennsylvania Supreme Court in the Contractors' Lien law is creating consternation in all circles connected with the building trades. It will tend to drive dishonest and irresponsible Pittsburg contractors out of business and also effect about 1,000 contract lien cases pending in Allegheny County. The case in which the decision was made was that of Schroeder vs. Galland in Lackawanna County. Schroeder sued to recover money for work done on a building on which he was sub-contractar under a head contractor named Olmstead. The latter contracted with Galland to deliver the building. The controlling question was, can a sub-contractor file a lien for the work done and materials furnished notwithstanding the stipulations of the original contract? The decision prevents sub-contractors from recovering from an owner money which the chief contractor fails to pay for work done by the sub-contractor on a building.

One innovation caused by this decision will be that sub-contractors will exact a bond or other security to guarantee payment for work done.

The American Zinc Lead Company has been organized in Portland, Me., with a capital of $500,000. The officers are: President, J. Q. Bennett, Boston; Directors, J. Q. Bennett, Henry L. Millis, C. J. Whitmore, Herbert Nash, W. H. Whitmore, Geo. E. Parker, Wm. B. Sewall, all of Boston; Treasurer, Herbert Nash, Boston; Clerk, L. W. Bates, Portland; General Superintendent, F. L. Bartlett, Portland. The purposes of the corporation are for manufacturing zinc lead pigment under the patents of F. L. Bartlett. This process was described in the ENGINEERING AND MINING JOURNAL of August 3d, 1889. The company having purchased all the patents of Mr. Bartlett, large works will be erected in Colorado for the purpose of smelting ores of zinc, lead and silver. The Portland Smelting Works have been running under these patents for the past two years, and the demand for the paint produced has been and is now largely in excess of the capacity of the works. Eight patents have been granted Mr. Bartlett, covering the treatment of ores in all stages. The novelty of the processes consists in being able to take the ore as it comes from the mine and in one continuous operation convert it into a pure zinc-lead pigment suitable for all purposes where white lead is now used; at the same time about all the gold, silver and copper is saved in the same operation. Plans have been drawn up for the erection of a plant in Colorado covering 3½ acres of ground and capable of turning out two carloads of finished pigment daily. Mr. Bartlett will leave Portland shortly to superintend the erection of the works. We are officially advised that the location will probably be made at Colorado City or Denver, with branch works in Leadville and in New Mexico. The stockholders are well known Boston business men.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

822. Sugar evaporator with a capacity of 20,000 pounds per day, to be run in connection with a canning factory. Texas.

823. 80-H. P. engine and boiler for furniture factory. Georgia.

824. Complete outfit for weekly newspaper and job offices, with cylinder press, engine, etc. Virginia.

825. Hoisting, boring, and all other machinery necessary for a coal mine, the product of which will be from 1,000 to 1,500 tons per day from three shafts. Virginia.

826. A heavy milling machine and steam hammer. Georgia.

827. Electric plant. North Carolina.

828. Four, six, and eight-inch cast-iron pipe to stand 300 pounds hydrostatic power. West Virginia.

829. Pig lead for 2,000 feet of piping. West Virginia.

830. 40 H. P. cut-off engine and 50 H. P. boiler, complete, with all fixtures. South Carolina.

831. Complete brick outfit. South Carolina.

832. Corrugated iron roofing and siding for factory building. South Carolina.

833. Everything necessary to install 30 miles street railway from horse and steam to electric power. Alabama.

834. Wood-working machinery.—Sawmill outfit to cut 20,000 feet per day, shingle mill to cut 40,000 shingles per day and power to operate. Also feed rip saw. Georgia.

835. Machinery to manufacture ax handles and spokes. Alabama.

836. Addresses of iron ore washing machinery. Maryland.

837. Electric lamps for coal mines. New York.

839. Hoisting engine, double drum, link motion, about 40 H. P. New York.

840. A brick press that will make brick direct from the bank ready to go at once to the kiln. If such a press can be purchased, will also want two drying pans, 7 to 8 feet in diameter, elevator, engine, boiler, drum and steel wire rope for incline, together with all the appurtenances needed in an entire new brick plant. Kentucky.

841. Two hand elevators—one for freight and one for passengers Tennessee.

842. A hand-power brick press and pug mill. Texas.

843. Pipe and power to raise water for 40 families from side to top of mountain. Distance from water to tank on mountain, 1,500 feet; perpendicular distance from water to tank, 175 feet. South Carolina.

844. Estimates on electric light machinery.

845. Complete plant for making brick. Georgia.

846. Quotations on a set of machinery for fluting and repairing "fluted rolls" for cotton machinery, excepting picker-rolls. Massachusetts.

848. A second-hand, 50 to 60 H. P. portable, tubular boiler (horizontal or vertical). Must be in good condition and ready for immediate use, New York.

849. Machinery suitable for a light draught side wheel steamer, 55 x 12 x 4, to make seven miles per hour. Florida.

850. Seventy H. P. boiler, 40 H. P. engine, 70 saw gin condenser and feeder. Lowest figure delivered. South Carolina.

851. Bids on 10 stamp mill complete with engine and boiler. North Carolina.

852. One set of head blocks without carriage, and made so that the sawyer can do his own setting without moving from his position at the saw. Colorado.

854. Corliss engines, boilers, pumps, heaters, shafting, pulleys and friction couplings for electric light plant. Connecticut.

855. Flooring machine, gang edger, and a dry kiln of 10,000 feet daily capacity. South Carolina.

856. One hundred tons 30-pound second-hand T-rails, suitable to be re-laid. South Carolina.

857. Ice machine, 16-inch swing, common wood turning lathe and emery wheel. Virginia.

858. Locomotive (second hand preferred), logging cars, 30-pound T-rails and fastenings, for a road four miles long. Georgia.

AMERICAN GOODS WANTED ABROAD.

838. Addresses of manufacturers of steam plows. Cuba.

847. Prices of sugar machinery, coffee hullers, cleaners, polishers and street sprinklers. Venezuela.

853. Catalogues of machinery and plant suitable for dredging beaches and river beds for gold, together with the appliances (tables, etc.) for saving the gold. England.

GENERAL MINING NEWS.

CHICAGO, PORTLAND AND WABASH RAILROAD.—Articles of incorporation have been forwarded to Indianapolis, to be filed with the Secretary of State, extending this railroad from a point on the Ohio & Indiana State line to Hammond, Ind. The road will connect east of Porland, Ind., with the Black Diamond route, and will give Chicago a new line to the Ohio coal fields.

ALASKA.

(From an Occasional Correspondent.)

The season for prospecting will be rather late as also the work of opening mines higher up the mountains unless our present warm rains continue and take off the snow.

The Treadwell works are running once more to its full capacity and Capt. Meins, its superintendent bears a smile again that has been absent since October last when water commenced to get short. The mine looks as well as ever, and I learn that a great deal of sluicing will be done as soon as the weather will permit it.

At the Mexican group a large force of men is at work prospecting and opening the ground. Reduction works are not yet talked of, and may not be built this season, as the parties interested are well aware that before commencing them they ought to know what the mines contain. They do not intend to build works and then hunt for a mine to suit the works, but will build works to suit the mine.

There is still a great deal of snow at Silver Bow Basin, and those interested there think that nothing of any consequence can be done there before June. During the winter all work was suspended there except the driving of a tunnel by the Nowell Company. which has progressed finely considering the hard winter.

Mr. A. Campbell has brought up a small mill, which he intends placing on his property in the Basin during the summer.

Messrs. Willoughby & Ware also received a small Huntington mill for their property on Admiralty Island. Thus although somewhat late the owners of properties promising well, to say the least, will make them enter the producing list.

SHEEP CREEK.—More or less work has been going on in this camp all winter and shows up remarkably well. It is stated that several new producers will be added there this season. At present a force of men is at work building a wagon road, which is much needed, as it will reduce the cost of shipping ore and delivering material at the camp materially.

More or less work has also been going on at Berner's Bay, but I have not learned anything of the results.

Some of the owners of property at Sumdam Bay are already on the ground opening up their prospects. At this place mineral of value was only discovered last summer. The ore there at one place contains copper and silver, while at another section a fine gold ore is found, which latter contains over $300 per ton. The vein is said to be of good size. It is very likely that one or two properties will be producers this season.

The Bear's Nest has been prospected by Mr. John A. Bernhardt, as he says, in the interest of a German syndicate. At present work is stopped, but reports have it that it will be resumed shortly.

ALASKA.

ARIZONA.

(From our Special Correspondent.)

Mining in Arizona shows at present more activity and promise than for many years past. Operations now going on in the different counties and camps are harbingers of better times ahead; more people, a greater consumption of home products, and better markets for the same, follow in the wake of successful mining enterprises. The number of mills, smelters, etc., now in operation in the territory may be considered an index of the condition of such ventures. The number of gold mills now in operation seems to indicate that Arizona, as a field for gold quartz mining, is not unimportant. Among those that are at work may be named the Congress, 20 stamps; the Phœnix, 20 stamps (more stamps talked of); the Mammoth, 30 stamps, 20 more going in; the Haqua Hala, 10 stamps; the Bent & Sampson, 10 stamps, more talked of, also a number below Prescott that are running. Altogether there are some eight or ten gold mills in successful operation. Next in point of activity come our copper mines and smelters, the Copper Queen, Old Globe and Clifton copper mines are pretty well known; among the new ones are the Lake Shore, near Casa Grande; the Silver Bell group, below Red Rock; the Buffalo, at Globe; the Burgess mines, on the San Pedro; the Duganes, Harstraw, etc. Silver mining appears to drag a little, although the Reymat is increasing its capacity; the Vekal is blocking out ore for a long run; the Aravaiha Cañon Company is beginning operations; more chloriding is probably done and more ore shipped, but for large enterprises, silver mining has certainly fallen to the third rank in Arizona. Doubtless there are more stable companies starting and operated than for many years. "Wildcats," a year or two ago, showed themselves on every hand, but their places have now been taken by solid operators, and let us hope that the revival will be followed only by legitmate investors.

MARICOPA COUNTY.

MESHACERTY MINING COMPANY.—It is proposed to incorporate the Meshacerty mine, adjoining the Phœnix Mining Company's property, into a stock company, under the laws of the State of New York, stock non-assessable, with a capital of $500,000, or 500,000 shares of $1 each, of which 400,000 shares shall be put aside for working capital, 200,000 shares being offered at 20 cents each. The property was located in 1879 by Thomas Campbell, and has been in his possession and that of his heirs ever since. It consists of two full claims 1,500x600 feet each, named respectively the Meshacerty and the Republic, and in conformation and general character is said to be like the Phœnix.

The mother-lode, or black ledge, has been a cross-cut in the Phœnix at a depth of 80 feet, and found to be 54 feet in width, producing ore which assays $8@$12 per ton. A tunnel on the Meshacerty claim has been run 165 feet, showing a vein of ore that assays, it is said, $8 per ton. One shaft has been sunk 65 feet, and another on the Republic 40 feet, both showing ore which is not on the Black Ledge (this being the large vein that runs from the Phœnix mine). Mr. A. W. Peters, Consolidated Exchange, 60 Broadway, is in charge of the New York office, and will answer all inquiries concerning the property.

ORO BELLA MINING COMPANY.—The stamp and concentrating mill of this company is running on ore from Gray Eagle mine, which the company recently purchased. Under the direction of Superintendent Helm, the mill is doing good work, nearly all the gold and a high percentage of the silver, it is stated, being saved, and less than one dollar in gold is left in the tailings. A substantial three-rail gravity tramway is being constructed from the mine to the mill.

PHŒNIX MINING COMPANY.—A report recently received says that vanadium has been found to occur in this company's ore as vanadiate of lead. What had been previously thought to be chromate of lead is really vanadiate of lead, for which there is an extensive demand, it being largely used in making aniline black. There is a good market for every pound of vanadiate of lead that can be extracted. Steps are being taken to ascertain the percentage of vanadium in the ore. If the results prove satisfactory the new discovery may prove a source of income of some importance. This property is opening up in a highly satisfactory manner, and as the Frue concentrators are now at work the returns will soon begin to have a margin even from the small mill. Eventually the company will, no doubt, have 100 or more stamps running.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—The company has issued the following circular to the stockholders, dated May 15th:

Letter from acting superintendent, May 3d: "There is no improvement in No. 2 rock. We are still running 20 stamps from rock taken out of No. 2 level. We crushed 1,382 tons of rock last month." Letter. May 6th.—"No. 3 level not doing so well. Shipped gold bullion for April yesterday." Telegram. May 7th.—"Have struck a bunch of low grade ore in No. 2 (Indiana) cross cut." Letter from Mr. Hayward. May 8th.—"Jones is now drifting and cross cutting the Indiana ground and has encountered some bunches of low grade quartz." But twenty stamps are now being run. The amount of the clean-up for April was $5,055.63. The superintendent reports that 1,382 tons were crushed, which shows a yield of $3.65 per ton. The last report states that the company is ruuning 30 stamps, and prospects are more encouraging.

BUTTE COUNTY.

CAPE AND GREEK MINING COMPANIES.—On the 15th inst. these properties, which are situated in the bed of the Weather River, commencing at the eastern boundary of Oroville, and extending up the river nearly two miles, have been sold The upper boundary of the ground was formerly known as the Cape claim, and was flumed in 1856, at which time $1,000,000 was taken out. Maj. Frank McLaughlin made the sale and an English company is the purchaser. The price is thought to run up into hundreds of thousands. In addition to the mines, the company will open tracts of country by an irrigation canal, which will create a great power adjacent to the place.

NEVADA COUNTY.

BRUNSWICK CONSOLIDATED MINING COMPANY.—Mr. H. R Lounsbery, the treasurer of the company, has issued the following circular to the stockholders, dated May 17th: Very important information has been lately received from the superintendent of your mine at Grass Valley, California, of a rich strike of ore in the Idaho mine, which is adjacent to your property, and its effect in possibly increasing the value of the same is so likely, that it has been deemed as serving your interests that such information as is possessed shall be given you. The official letters received weekly from the superintendent are on file at my office, No. 57 Broadway, where they may be perused.

COLORADO.

OURAY COUNTY.

MT. SNEFFLES TERRIBLE MINING COMPANY.—Local papers state that this company has, after deeding valuable town property to its running-mate the Virginius (Caroline Mining Company), made an assignment in which the assets are estimated at $54,850 and liabilities at $52,257.17.

PITKIN COUNTY.

The flood in the mines at the base of Aspen mountain continues unabated, says the Aspen *Times*. In fact the flow of water is now thought to be heavier than it was a few days ago. The water had been rising rapidly in the works of the Aspen Mining and Smelting Company and has flooded the first, thus entirely banishing the men from the ground below the Veteran tunnel.

TOURTELOTTE MINING COMPANY.—The shaft on this property, now being worked by the Bay State Mining Company, is 620 feet deep, and it is the intention of the company to continue to a depth of 800 feet. A contract has been let for another 100 feet at $16.50 per foot. When a depth of 800 feet is reached, if nothing has been found in the short lime, the company will drift west to the contact. Such a drift will be more than 100 feet deeper than the Compromise tunnel.

SAN JUAN COUNTY.

RED CLIFF GOLD AND SILVER MINING COMPANY.—This company was reorganized in Topeka, Kan., recently, under the name of the Astor Gold and Silver Mining Company. The property consists of twelve claims or mining lodes in Eureka gulch, and was acquired by the company about ten years ago under the management of the Rev. C. Monjeau, and about $40,000 have been expended in and about the development of the property. Some six or seven years ago the company, for the purpose of raising money to acquire title from the United States and make improvements, executed a trust deed on its property. The property was sold under the powers of the trust deed in Boston in February last, and purchased by Thomas Nickerson and George S. Howard, of Boston, who acted as a committee for the bondholders. The purchasers of the property have procured a charter for a new corporation to be known as the Astor Gold and Silver Mining Company. (See the ENGINEERING AND MINING JOURNAL for the 26th ult.) The directors of the company are Thomas Nickerson and E. C. Fitz, of Boston; C. K. Halliday, J. N. Strickler and John Guthrie, of Topeka. The officers are J hn Guthrie, president, and Edward Wilder, secretary and treasurer.

SAGAUCHE COUNTY.

CASSELL GOLD AND SILVER MINING COMPANY.—This company, to which we have referred in many previous issues, has been incorporated at Denver, Colo., with ex-Senator Tabor as president, and a capital stock of $1,000,000. The company has patented a chemical process by which it is claimed that the most refractory ores can be reduced at a cost of $5 per ton. A five-ton establishment has been erected at Crestone.

The inventor is a Scotchman, and works have been erected at Glasgow, in New Zealand and in South Africa. Those at Crestone are the first in America, but the company proposes to build works in Utah, Nevada and California. The Macarthur-Forest process which was described in the ENGINEERING AND MINING JOURNAL of December 21st, 1889, and criticized by a correspondent in the issue of January 18th, 1890, is the improved process which the Cassell Company at Glasgow owns.

SUMMIT COUNTY.

RADICAL MINING COMPANY.—The company's property will be sold at public auction at the Real Estate Exchange and Salesrooms, Limited, at Nos. 59 to 65 Liberty street, New York, June 27th, at 12 o'clock noon, by Charles S. Brown, auctioneer

The company having defaulted in the payment of the bonds, the interest thereon from the date of the bonds is still due and unpaid.

GEORGIA.

(From our Special Correspondent.)

BARTOW COUNTY.

The bauxite of this county is attracting much attention; almost daily strangers can be seen riding through the woods and fields prospecting. On the 5th inst., G. K. Woodward, of New York, and a couple of other gentlemen, were here for the same purpose. The Barnesley place has been sold, and the price paid is reported to have been $80,000. Specimens from this county that I have seen are quite pure, and will, no doubt, compare very favorably with those of any section.

GEORGIA MINING, MANUFACTURING AND INVESTMENT COMPANY.—This, one of the largest companies in the State, recently held its annual meeting and elected officers: Mr. Julius Brown, president; Senator Joseph E. Brown, vice-president; Franklin Wells, of Boston, general manager, and Elijah A. Brown, secretary and treasurer. The directors are: Julius Brown, Joseph E. Brown, Jacob W. Seaver, Robert J. Lowery, Elijah A. Brown, Franklin Wells, Joseph N. Brown and Willard P. Ward. The company owns and operates the Dade Coal Mines. Rising Fawn Furnaces with a daily capacity of 100 tons, the Chattanooga Furnaces of the same capacity, and a large body of iron and manganese lands in this county above Cartersville. This latter property is in the heart of the best iron region in the State, some of the old furnaces that worked before the war, still standing. It is near the Etowah property which was sold for $180,000 about a year ago.

CHEROKEE COUNTY.

The Atlanta *Constitution* is responsible for an article from which I will quote extracts as follows: "For some time tin and silver veins have been thought to exist in Cherokee County. The three lucky gentlemen, Mr. A. S. Thrasher, of Chattanooga, with Judge John Cunningham, and Mr. J. T. McLendon, have discovered that the vein really does exist on a tract of land owned by them east of Canton, and only 40 miles from Atanta. Before announcing the discovery a thorough test was made and it was proved beyond question that the vein of tin was 40 feet wide and at least 9 feet deep. The ore taken from several points along the vein assayed beyond the highest hopes of the discoverers. The silver veins which run parallel to the tin veins also assay very rich. As, however, tin has never been discovered before in paying quantities in America, the discovery of it in Cherokee County is considered the most important find."

GWINNETT COUNTY.

There has been considerable talk of late concerning the Harris and other gold mines in this county. There is no reason why there should not be some good properties among them, as from 1830 to 1850, they were worked with profit; the free milling ores were worked and the mines abandoned when they ran into sulphurets at water level. Options on these properties have been taken several times, and recently Mr. James West of Fort Payne, Ala., and a friend from Vermont became interested in the Harris. After thoroughly sampling and testing the ores it is said that they have purchased it for the sum of $40,000. The assays of the ores are reported to run from $20 to $150 per ton.

SPAULDING COUNTY.

At Griffin a party of capitalists has formed a stock company for the purpose of putting up an iron foundry for treating the neighboring iron ores. $50,000 are to be expended in erecting this furnace, and it is expected to be running in a very short time, as all the stock has been taken, the site purchased, and the charter applied for.

IDAHO.

OWYHEE COUNTY.

(From our Special Correspondent.)

DE LAMAR, May 19.

The Gravity Tramway, costing over $25,000, capacity three tons per hour, has been finished to the new mill now being constructed at the De Lamar group of mines; railroad connecting with Northern and Union Pacific railroad will be built, and the output of this section materially increased.

It is reported that Denver parties have secured the copper mines on South Mountain, 18 miles from here, and will fully develop them. This vein is over 200 feet in width in places, and outcrops for about 2,400 feet in length.

Mr. De Lamar is at Denver, shipping balance of his machinery for 100-stamp mill.

MAINE.

OXFORD COUNTY.

Reports state that the gold-mining craze on Swift river continues unabated. Gum Corner, in the town of Byron, is the center of operations, and miners are flocking there by hundreds. The pioneer and discoverer of the field is G. A. Norcross, of Augusta Nearly all the land in the vicinity has been bought up by prospectors. Gold has been found over a large area. Mining companies have recently been formed in Portland and Lewiston, with a large capital. It is all placer mining at present, but Mr. Norcross hopes to discover the quartz lead. Miners' claims are held at from $50 to $75. A short time ago A. O. Reed sent half an ounce of Byron gold to the United States Assayer at New York City, and received this reply: "I find this to be over 950 parts in 1,000 fine, and worth $19 an ounce" The gold so far averages $3 an ounce better than California gold.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, May 19.

There was a large output of ore from the lead and zinc mines for the week ending May 17th. There was no interruption by bad weather. The ore market continued strong all week, with the tendency still upward. Lead advanced to $23 per thousand, and some sales of zinc ore were made at $27 per ton The following is the amount sold from each camp: Joplin mines, 1,239,132 pounds zinc ore and 178,717 lead. Value, $19,602.50.

Webb City mines, 1,848,080 lbs. zinc ore and 75,440 lead; value, $25,239.

Carterville mines, 539,840 lbs. zinc ore and 65,270 lead; value, $8,347.

Zincite mines, 211,679 lbs. zinc ore and 2,650 lead; value; $2,746.

Oronoga mines, 42,820 lbs. zinc ore and 3,940 lead; value, $633.

Sherwood mines, 25,860 lbs. zinc ore; value, $319.

Lehigh mines, 284,200 lbs. zinc ore; value, $3,410.40.

Galena, Kans., mines, 875,070 lbs. zinc ore and 88,720 lead; value, $9,832.

All districts, total value, $70,128.90.

The Grand Falls Electric Power Company is now making a preliminary survey for the purpose of putting in a dam to prevent waste of water. The company has received a great many applications from mining companies for electric power.

The output of Albert Frye's Diamond mine, for the week ending May 17th, sold for $2,417.

Mefford & Klotz, operating on the interstate land just east of the city limits of Joplin, have opened up a very large body of zinc ore. They are taking out zinc blende in chunks that weigh from 200 to 1,000 pounds.

Snyder Bros.' mines have now 10 producing shafts and a number are being sunk. Four months ago there was not a single shaft on this land, which now is turning out 250,000 lbs. zinc ore and 10,000 lead. This development proves almost conclusively the great and almost inexhaustible wealth that lies under thousands of acres of Southwest Missouri.

Mr. Van Riper reports that the mines of Aurora are in a very prosperous condition and that some large sales have been consummated.

Manager Wetherell, of the Empire Company, is putting in an incline tramway in order to facilitate dumping the ore on the crusher floor.

The Fort Scott & Gulf railroad is building a branch to the Empire Concentrating plant.

The Consolidated Company is opening up some large and fine bodies of zinc ore at a depth of 120 to 150 feet.

Crossman Bros. have just moved one of their drilling machines to the Granby land and will commence drilling in the bottom of an old 100-foot shaft.

Dorrington & Co., operating on the Granby land, are sinking their pump shaft deeper for better ore and also to facilitate the drainage of the ground.

On the Snyder Bros.' mines, a new tract of land, joined on three sides by the Empire mines, the Snyder Bros. commenced development less than four months ago, and have now 10 producing shafts. Your correspondent visited the mines last week, and found everything bristling with activity. I must mention, in particular, one shaft in which the ore body was reached at a depth of only 30 feet, and from this shaft alone over 30 tons of zinc ore were produced during the week. Adjoining this property on the east are the Diamond mines, operated by A. H. Frye. This is also comparatively a new property, but has proved a veritable bonanza. The opening up of these two valuable properties has built up a regular mining camp, reminding the visitor very much of the early days of Leadville, Colo.

The Scotland Mining Company, composed of Henry Wymann, and W. H. Fairbanks, of Joplin, and J. W. Burch, of Carthage, has been organized. The new company will work the south 80 acres of the Scotland mining lands, which largely produced surface lead in the early days.

A remarkable strike of zinc ore has been made in Gordon Hollow. In cutting a small drift into the ore body 16 feet, over 40 tons of high-grade zinc ore were taken out.

The Crescent is the name of a new company operating on the Consolidated Company land. It has made some extensive surface improvements during the week, and will start a drift on an eight-foot face of ore at a depth of 35 feet.

Mr. S. J. Frye, the pioneer prospector, brought your correspondent a magnificent specimen of crystallized zinc ore taken from a depth of 110 feet in the old South St. Louis shaft, on the Murphy land, west of Belville. This shaft has been a wonderful producer from the top run of ore, and now Mr. Frye has cut the second run of zinc ore, which promises to be larger than the former.

The Center Creek Company, of Webb City, still heads the list by producing 1,104,940 pounds zinc ore and 4494 lead during the week.

The White Lead Works produced 14,000 pounds of white lead during the twenty-four hours ending at noon Saturday.

DELAWARE LEAD AND ZINC MINING COMPANY.—This company has filed articles of incorporation, with a paid up capital of $25,000, divided into 25,000 shares of $1 each. The incorporators are John A. King, of St. Louis; Bernard Gilfin, of Sanborn, Colo.; and John M. Kehlor, of Joplin, Mo.

GLOBE MINING AND MILLING COMPANY OF CARTHAGE.—This company has filed articles of association, with a paid up capital of $60,000, divided into 60,000 shares at $1 each. The stockholders are T. D. Taylor, Leon Morgan, of Kansas City; and J. M. Temple, L. R. Ruth and F. A. Temple, of Carthage. The officers are T. D. Taylor, president; J. M. Temple, vice-president; Leon Morgan, secretary; L. R. Ruth, treasurer. The company controls, and expects to operate, the Magnet mines.

OSWEGO MINING COMPANY.—At a meeting of the stockholders of this company, held May 15th, it was voted to increase the capital stock of the company from $50,000 to $500,000. This company owns 756 acres of mineral land adjoining the city of Joplin on the south and east. This property has produced about $3,000,000 worth of lead and zinc ores and but a small portion of the land has been prospected.

SEVEN TO ONE MINING COMPANY.—This company composed of A. B. McConnell, L. G. Bishop, Chas. Earl, W. W. Dunlap, Harvey Dillon, O. E. Waggoner, D. A. Gault and H. L. Shepard, has just completed platting its 40 acres west of Empire and Diamond mines and will at once put in a good pump plant.

UNION MINING COMPANY.—This organization, located at Webb City, with a capital stock of $50,000, is operating three mining lots on the Nevada Mining Company's land, and 40 acres of the Dougherty land northwest of Webb City. The officers of the company are: J. A. Strong, general manager; I. Strong, secretary and treasurer; M. Harness, superintendent of mines; F. M. McCaffie, prospector, and M. B. Barney, salesman. The traditional distribution of official functions has intentionally been changed in this organization.

VICTOR MINING COMPANY, OF JOPLIN. This company has filed articles of association with a paid up capital of $100,000 divided into 100,000 shares of $1 each. The stockholders are G. B. Young, L. F. Young, J. W. Arnold, M. E. Arnold, F. J. Arnold, W. P. Welton, of Joplin, and M. F. Flanders, of Toledo, Ohio. The company has a tract of land south of Webb City and Carterville, which is under the able management of Mr. Carl Hanrick who has made some substantial surface improvements and is sinking a large working shaft. The mine has been a steady producer for over one year.

MICHIGAN.

COPPER MINES.

(From our Special Correspondent.)

HANCOCK, May 20.

Your correspondent is able to chronicle that a majority of the copper mining companies have raised the wages of their men 10 per cent. since the copper market has taken an upward step.

The County Board of Supervisors has placed the following valuations upon the mines of the county:

Calumet & Hecla	$28,500,000
Tamarack	6,480,000
Quincy	3,240,000
Osceola	1,450,000
Atlantic	600,000
Kearsarge	600,000
Huron	120,000

This value was fixed by the stock quotations on the second Monday in April. In addition, Centennial will be assessed at $15 per share, Pewabic $8, and Tamarack, Jr., at $30.

This valuation has been taken as a basis, and every piece of county property will be assessed for what it will sell in open market.

It seems to be the general belief that there will be a stirring up of dry bones in the copper country this spring and coming summer. There are many idle copper mines in Houghton, Keweenaw and Ontonagon counties, which have reached various stages of development. Operations in them were suspended when copper was cheap, blasting powder black, labor dear and the air compressor unknown. The march of progress has lessened the cost of mining along all of these lines, and at the same time has created a demand for native copper which is monthly increasing, and which will soon call for more of a supply than the dozen producing mines will be able, or at least willing, to turn out. The result will be a resumption of operations on many of these idle properties. Among the mines now standing idle, which, at present prices, possibly could be worked to a profit, might be mentioned the following: Isle Royale, Shelden & Columbia, Grand Portage, Hancock, Wolverine, Phœnix, Cliff, Lac La Belle (Delaware), Minnesota Ridge and Mass.

The Calumet Conglomerate has grown to be quite a fa in the mining world. The craze has been brought about by the discoveries reported to have been made on the Centennial property. Anent these Centennial explorations, and the effect which

they have had on the stock market, it has been suggested that the Calumet & Hecla, whose stock is hanging around the low figure of $300, explore for the Centennial Conglomerate; possibly there is money in it!

CALUMET AND HECLA MINING COMPANY.—The Red Jacket or vertical shaft which is being sunk by this company to intersect its lode below the lowest of its workings, was sunk 107 feet during the month ending May 17, making a total depth of 1,618 feet. The record for the month preceding was 127 feet. The decreased distance last month is attributed to the frequent timberings, made necessary by soft ground, this consuming considerable time. The cross-cut which is being driven toward this shaft from the 32 level No. 4 Calumet shaft, is in between 500 and 600 feet. It is nearly vertical, and will strike the shaft 2,200 feet from the surface. There remains about 1,000 feet to cover, which, it is estimated, will be traversed by the middle of October. At the rate which the vertical shaft has been going down it will reach this 2,200-foot point about the same time. It is estimated that the shaft will strike the lode 3,300 feet below the surface.

HUNGARIAN MINING COMPANY.—The 25-cents per share assessment due on the Hungarian property, May 1st, is being rapidly paid in. The month of May will probably chronicle a commencement of explorations. R. R. Goodell, of Houghton, is agent of the property.

PEWABIC MINING COMPANY.—The time is rapidly drawing near when this property—that bone of contention which stands between the Franklin and Quincy people—is to be disposed of. The decree of the United States Supreme Court, ordering it sold to the highest bidder, has been entered in the United States District Court at Marquette, and Peter White of that city, appointed master-in-chancery and ordered to execute the mandate. It is probable that the sale will take place within a comparatively short period. We have it from one of the best posted mining men of the lake country, that the Mason (Quincy) party owns, by a wide margin, the controlling interest in the property. At the auction sale any bid which may be made will virtually be into its hands. In consideration of this condition of affairs, it is concluded that the Quincy will obtain the mine. There has been circulated a rumor that the property would be divided. Those who are acquainted with the history of the relations which one party has borne toward the other hardly think this possible.

TAMARACK MINING COMPANY.—On the morning of April 21 (see ENGINEERING AND MINING JOURNAL, April 26), fire destroyed the hoisting plant of No. 1, Tamarack shaft, as well as a 17-drill compressor plant. Within four weeks to a day the compressor was repaired, and is now in use. The hoisting engine has been overhauled and refitted, and by June 2 the mine will be again running full force, after an idleness of practically six weeks. During this time the compressor power has been used in opening up the property, and it can be said to be in much better shape to-day than before the fire. No. 2 shaft has been equipped with balance cages, and on Monday commenced hoisting operations.

THE WOLVERINE MINING COMPANY.—This company has given John Bagley, of Chicago, an option on its mine for $50,000. The property was opened in 1883, and has produced 989 tons 1,378 pounds of mineral. It has been standing idle since January, 1885. It is located in the mineral range south of the Kearsarge, and the workings are in the Kearsarge amygdaloid. It is described as follows: N. ½ of N. W. ¼ of sec. 7, town 53, range 32 west.

IRON MINES.

CHAPIN.—This mine will soon have four additional skips in operation to the number now employed. Room for these is being made but a short distance from the Ludington end of the property. At this point there is 35 feet of drift covering the ore, whereas but a few hundred feet distant the Hamilton shaft was sunk about 900 feet before the ore was encountered. The ore where this stripping is taking place will be worked from an open pit, and it is from this that the four skiproads will be run.

MONTANA.

CASCADE COUNTY.

NEIHART MINING AND REDUCTION COMPANY.—This company has acquired the Weatherwax mine in Yogo from T. E. Collins, C. W. Gardner and Mr. Madden. The Weatherwax has considerable development, and a five-stamp mill constitutes a part of its equipment. Gold ore was taken from the mine and reduced by an arasta, before the erection of the mill.

DEER LODGE COUNTY.

SAN FRANCISCO CONSOLIDATED MINING COMPANY.—This company's property has been sold at sheriff's sale, at Philipsburg, under an execution in favor of John F. Shepley. All the personal property was bought by John F. Shepley, trustee, for $5,000. The same gentleman also purchased the following described lodes and mill sites at the prices named: Two mill sites for $875 each; the E. D. Holland lode and improvements for $20,000; the North Frisco lode and improvements for $5,000; the Little Tom lode and improvements, $8,500; the Silver Star lode, $1,500; the Marie lode, $500, making a total of $42,250 paid for everything formerly owned by the San Francisco company in the district. It is presumed the purchase was made at the instance of the St. Louis stockholders. It is said that in the near future another effort will be made to find the lead.

JEFFERSON COUNTY.

CATARACT MINING COMPANY.—Wm. Thompson has been elected president, John Koontz vice-president, and T. Clewell secretary and treasurer of this company, operating in the Cataract district. The principal work will be directed to the development of the Boulder Chief.

LEWIS AND CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—The official report for April shows that the total weight of ore crushed during April was 6,600 tons; yield from the three mills, $100,500; working expenses for the month, $56,300; the estimated number of ounces contained in returns by assay being, gold, 2,912 ounces; silver, 31,240 ounces.

MEAGHER COUNTY.

ALABAMA MINING COMPANY.—Messrs. J. M. Kumpe, John Piser, Geo. Irwin and Frank Bates have recently filed articles of incorporation for this company, with a capital stock of $300,000; shares $1 each. It is organized for the purpose of developing the Alabama and Cleveland lodes, located about four miles from White Sulphur Springs.

ARMADA MINING COMPANY.—This company has been incorporated by J. H. Kane, W. H. Metcalfe, and L. Pearey. The capital stock is $250,000, shares $1 each.

GRAND CENTRAL MINING COMPANY.—This company has been incorporated, with Dr. Wm. Parberry, J. L. Fraser, Wm. Bogy, Wm. McGinness and John Shaw as incorporators. It is the purpose of the company to develop a property in the neighborhood of the Cumberland, at Castle.

MISSOULA COUNTY.

CALLOA.—This property, located east of the Homestake, in Park Cañon, was recently sold by E. H. Irvine, Son & Co. for $26,000 cash, John C. Henderson, of New York, being the purchaser. It was owned by Frank M. Murray and Patrick H. Meagher, of Butte. The Clinton mine, which adjoins the Callao, was sold some time ago for $12,000, and belongs also to Mr. Henderson.

LANDOWNER MINING COMPANY.—At the annual meeting, held at Missoula recently, the following directors were elected: H. E. Burch, Lee Warner, Smith Davis and W. H. Palmer. Subsequently these officers were elected: H. E. Burch, President; A. P. Tietjen, Vice-President, and Lee Warner, Secretary and Treasurer. The Landowner, a free-milling gold property, is located on Windfall Creek, about 18 miles south of the Iron Mountain, and already has some development. It is the intention of the company to commence operations soon and sink down to a further depth of 100 feet; then it is proposed to erect a mill. The Washington & Idaho Railroad is within 18 miles, and, it is expected, will be fully completed to the mine about June 15. The assays made show an average of about $45 per ton of free-millin g gold.

PARK COUNTY.

GENERAL OFFICE MINING AND REDUCTION COMPANY.—The incorporators of this company, of St. Paul, Minnesota, are C. S. Fee, N. C. Thrall, S. L. Moore, C. A. Clark, J. B. Baird, J. C. Pond, H. W. Pknauff, F. W. Wilsey, and T. S. Woodruff. Capital stock, $2,000,000; existence, ten years. The company has acquired the following properties in the New World district. Gold Leaf, Threadwell Extension, Little Granite, May Flower, Horn Silver, Delhousie, Grizzlie Bear, and is also part owner of Mountain View, Triangle and Little Pittsburg.

SILVER BOW COUNTY.

At a mass meeting in Butte of surface laborers the following agreement was unanimously adopted: "We, the undersigned, laboring men of Butte and vicinity, do hereby agree to form a union for the purpose of obtaining a uniform rate of wages based upon a scale such as no laboring man shall receive less than $3 per day for his labor.' The initiation fee of 50 cents was paid by nearly all present, and the organization named the Butte Laborers' Union.

BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The copper output of this company for April showed, says the Butte *Miner*, that besides 19,000 ounces of silver, the product of fine copper was about 2,200,000 pounds, which is a slight increase over the output during the winter months. There was also 20½ tons of ore shipped east during the month. This shipping ore comes from the centers of the veins of the Harris-Lloyd, Mountain View and the Colusas, and is considerably richer than copper mines. Nearly all the silver-copper matte produced by the company is sold to the Parrott company and treated at the Parrott smelter, which has the only Bessemer process in Montana for converting matte into pig copper.

BUTTE AND BOSTON MINING COMPANY.—Superintendent C. H. Palmer reports under date of May 13th: "At the Silver Bow Shaft No. 1 everything is looking well except east drift on 300 level. Stopes above 300 are good; second to none in this section, as one of our foremen said to me to day. West drift 400 carrying some fine ore. East drift 400 still better. Raise from 400 to 300 also looking well. Shaft is being sunk to 500-foot level, and is now 80 feet below 400. At No. 2 shaft at 400-foot level we have stationed in, and are now cross-cutting both north and south. In south cross-cut we are about entering the vein passed through in shaft at about the 300-foot level, and should reach the ore body this week. At the Belle of Butte we have new shaft and engine up and have resumed our underground work. Drift west looking well. East drift is badly broken up, ground 400 level. Will be ready to start to sink to 500-level in about three weeks. Main Gray Rock, 500-level, we are drifting on drift east. Very fair silver ore, but believe we shall have to sink to the 600 to obtain best results. East Gray Rock, Bell vein, carry four feet good copper, are yielding 10 per cent.—a portion 18 per cent. This in drift east on 500-level."

EMMA NEVADA MINING CO.—The directors of this company the incorporation of which was mentioned in our last issue, have elected the following officers: P. J. Brophy, president; W. G. Lewis, vice-president; M. P. Sipple, secretary, and Dan Tewey, treasurer. It was the sense of the meeting that no stock should be placed on the market at present. John Helehan, with a force of men, will prosecute work on the property.

NEVADA.

STOREY COUNTY—COMSTOCK LODE.

ALTA VS. BENTON MINING COMPANY.—This suit, set for trial in the District Court next June, is to recover the sum of $7,000, with interest from September, 1888, alleged due the plaintiff for hoisting waste rock and other material through the Alta shaft for the Benton Consolidated Company.

BENTON MINING COMPANY.—A. Loughran, who lately resigned as superintendent of this company, has begun suit in the district court against the company to recover $1,828, alleged due for salary as superintendent during portions of the years 1888, 1889 and 1890.

JUSTICE MINING COMPANY.—The superintendent's report of operations during the past fiscal year, submitted at the recent annual meeting of shareholders, contains the following information of interest: A winze sunk 100 feet below the 490 level shows good ore all the way down. The main north drift, 622 level, disclosed a length of 100 feet of ore of paying quality, and which is, no doubt, a continuation of the ore body on the 490 level. The winze below the 622 level is down 10 feet, showing good ore in the bottom. Sinking the shaft to a depth of 200 feet below the 622 level is to begin immediately. During the year there have been extracted from the 490 and 622 stopes 10,495 tons, 627 pounds of ore, which were reduced at the Washoe mill.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—An official letter from Jas. M. Kinkead, superintendent of this company, to Mr. S. White, Jr., dated 16th inst., states: "During the hard winter we have not been running the mill, but have kept the work running in the mine, extracting ore and doing considerable prospecting. We have a new development on 550 level which promises to be important. This is at the deepest point in the mine, and looks favorable for a bonanza. We will probably start the mill in June on selected ore, and with the increased price of silver we will be able to make a good showing."

OVERMAN MINING COMPANY.—The new incline winze on the 1,200 level of this property is down 13 feet, the bottom being in ore that will assay, it is claimed, averaging over $40 a ton. There is a south drift run from the shaft, and from this drift a northeast drift was run until the vein was struck, and then the drift was turned northwest to run with the ledge, which runs southeast and northwest. It is in this latter little drift that the winze is being sunk. This find is on the line with the string of ore found in the Crown Point and Belcher Mining companies.

NEW JERSEY.

ATLANTIC COUNTY.

According to a press dispatch, the citizens of Pleasantville are excited over the discovery of what they believe to be a silver mine. The supposed mine is about three miles above Pleasantville, on the line of the Reading Railroad. A shaft has been sunk about 28 feet. About 25 years ago the land was staked out as a silver mine, and at one time James Cannon, who was then owner of the land, was offered $10,000 to point out the spot from which he secured the specimens he exhibited to experts. The offer was refused, and his sons are now working with the owners of the land.

NEW MEXICO.

GRANT COUNTY.

MOUNTAIN VIEW MINING COMPANY.—In spite of the unfavorable report made by H. H. Sawyer to the owners at New Orleans, the Mountain View, says the Silver City *Sentinel*, at its greatest depth, 500 feet, yields a higher grade of ore than at any other point. Sawyer stated that the View was only a gash vein. As to that, it is like all other veins in the district; the main vein was fully formed and afterwards displaced by volcanic action, which causes the irregularity of ore bodies. The Mountain View vein runs continuous for about a mile in length, yielding high grade ore at

different points. At the depth of 120 feet Mr. Toby, the present manager, encountered seven inches of first-class ore. The character of the ore is native tellurium of gold and native chloride and sulphide of silver and gold predominating.

SANTA FE COUNTY.

Acting Secretary Chandler made on the 3rd inst. an important decision on the appeal of Albert Eisemanns from the decision of the Commissioner of the General Land Office rejecting his application to file a second coal land declaratory statement. The land in question is located in the Santa Fe land district. It was insisted on appeal that the filing of a coal declaratory statement, unless complete payment is made for the land embraced therein, as provided by law, does not exhaust the right of the applicant, and upon the expiration of such filing there is nothing in the law or regulations to prohibit the filing of a second coal declaratory statement by the same party. The acting secretary says that while the statute does not limit the party to one filing, it also does not expressly give him the right to more than one, but provides that on the prescribed conditions one "shall be entitled to preference in right of entry." The departmental regulation limiting the party to one filing is not, therefore, in conflict with the statute. The limitation in the regulations to one filing, the acting secretary holds, is "needful for carrying into effect the provisions of the law," as stipulated in the act. For without it (as a coal filing does not expire until twelve months after date thereof) a party without making proof and payment might hold the land covered by it for one year in addition to the six months, before filing is required. If he should then be permitted to make a second filing he might file upon the same or a different tract, and so continue indefinitely without payment to the Government. The secretary holds, finally, that a second coal land filing cannot be allowed in the absence of some valid excuse for abandoning the first.

CCPPER FALLS MINING COMPANY.—Negotiations are under way for a sale of the controlling interest in this company by Mr. David Nevins, to New York parties. Mr. Nevins practically owns the whole property. The company has liquidated its floating debt, and is said to be in a stronger position financially than for a long time. It was organized in the fall of 1845, and was known as the Copper Falls Company, which purchased some 4,000 acres mineral land for about $11,000. Considerable money was spent on the property, which was worked at a loss for a greater portion of the time. The company was reorganized several times, and 1,700 acres were sold to a new coupany for $30,000. The capital stock now consists of 40,000 shares, with a par value of $25. Under the "syndicate" the mine was operated at a profit, but after the syndicate collapsed it shut down. It is asserted that the mine can be properly worked with copper as low as 13 cents a pound.

NORTH CAROLINA.

CABARRUS COUNTY.

(From our Special Correspondent.)

CHARLOTTE, May 21.

CONSOLIDATED CAROLINIAN MINING COMPANY.—B. S. Cotes, and Charles E. Trippler, of New York, have recently purchased the J. A. Meisinheimer property with a view to developing and working. This property embraces 175 acres of land situated about 14 miles from Concord. Three shafts were put down to 35, 40 and 100 feet, the last of which is well timbered; at the 52 foot level, the vein was cut across, showing, it is said, six feet in width, including the bindings. The vein matter consists of quartz and brown ore, the binding is an altering talcose slate. The ores pan well, and averages of the vein assayed at the United States Assay Office for Mr. Cotes from $2.21 to $5.46 per ton of 2,000 pounds.

Buildings for an office, superintendent's residence and the men's quarters have been erected; and it is intended to put up a mill (probably 20 stamp) upon the return of Mr. Cotes from New York. The Mecklenburg Iron Works, of Charlotte, N. C., have already been consulted about machinery.

GASTON COUNTY.

CATAWBA.—The old "pump" shaft is no longer the working shaft. A new shaft called the "new ore iron shaft" has been sunk. While prospecting it was ascertained that the gold-bearing vein was intersected at a distance of about 1,400 feet from the old shaft by a magnetic iron vein, forming an X with very acute angles. Accordingly, the shaft was sunk very near the pump shaft side of the intersection, and at the depth of 176 feet levels were driven to cross-cut the veins. On the one side the magnetic vein was cut, and is reported to be 12 feet thick; on the other side the gold-bearing vein was cut, showing a width of about 15 feet. This latter vein was lost in the pump shaft by faulting which has since been found to be about 75 feet eastward. The ore body here had a length of 100 feet and a 12-foot stope, wielding about $8,000. As soon as the capping of the vein was struck, Capt. Horton decided to sink the shaft 100 feet deeper and again cross cut the ore body, where it should theoretically give 100 foot stope. This was done and when the vein was cut at the 270 level, it showed a little greater width than at the 170, realizing all that had been expected of it. The vein matter here is very different from the limestone of the other shafts, it being an easy milling brown ore from which about $3 per ton is extracted.

The mill was started up on the 19th inst.; at present it consists of ten stamps, with plates, and two ore mashers of Captain Horton's own design. The mine is in good condition to make a long and profitable run, as it is well equipped, well managed, is undoubtedly one of the best properties in the State, and has an immense body of good-working ore in sight.

MONTGOMERY COUNTY.

THE SAUNDERS MINE.—Mr. Kirk, the owner of this property, is now negotiating with the Genesee Mining Company for the purchase of its machinery, which he hopes soon to erect on his property. There will be some other machinery necessary for the plant, which will also be purchased.

SAM CHRISTIAN MINING COMPANY.—It is reported that the managing director of this company is arranging with the London directors to raise more money for developing, which will probably be done at once.

STANLY COUNTY.

STANLY FREEHOLD MINING COMPANY.—This company is to be reorganized under the name of the Parker Gold Mining Company, Limited. As was announced in the JOURNAL some time ago, it is the intention of the directors and manager to operate a stamp mill in conjunction with hydraulicking. Before getting up his plans for the mill, Captain Judd has wisely determined to avail himself of all the experience of other mill men on this particular system, and on the 21st inst. he left for Georgia for the purpose of carefully investigating the principal properties and their workings. He will undoubtedly gain a great deal of information, as this system of mining and milling is universally used there, so that it is known as the Georgian system better than by any other name. The larger part of the mine managers of this State would probably improve their bullion output by "going and doing likewise" so far as thoroughly posting themselves on the best contemporaneous practice before erecting costly mills is concerned. I can mention cases where hundreds of thousands of dollars have been thrown away that could have been saved by a more careful selection of size and construction details of the mill. Capt. Judd's company is to be congratulated on having an energetic, prudent and efficient manager.

OHIO.

COLUMBUS & HOCKING COAL AND IRON COMPANY.—At a meeting of the stockholders of this company, held at Columbus on the 21st inst., H. H. Adams, W. E. Coxe, Jay O. Moss, J. A. Long, P. Farquhur, J. H. Davis, E. S. Larcher, A. O. Beebe and W. J. Reddington were elected Directors. The issue of $500,000 preferred stock was authorized. The annual statement shows net earnings of $121,000; interest charges, $60,000; surplus, $61,000. The directors have passed a resolution to have the accounts of the company audited by a public accountant, sworn to and certified quarterly.

DAYTON, HOCKING VALLEY & EASTERN RAILROAD COMPANY.—This company, with its principal office at Dayton, and a capital stock of $200,000, was granted a certificate of incorporation by the Secretary of State on the 29th ult. The Southern business of the road is at Marietta, on the Ohio River, and the road passes through the counties of Washington, Athens, Hocking, Vinton, Ross, Fayette, Green and Montgomery to Dayton. The line takes the Hocking Valley coal fields, and at Dayton traffic arrangements will be made with the Cincinnati, Hamilton & Dayton and the "Big Four" to forward the products of the mines to the larger markets. The incorporators and first board of directors are R. D. Marshall, John K. McIntyre, Frank T. Huffman, Charles E. Drury and Jacob Sutweiler, Jr.

STARK COUNTY.

MINGLEWOOD.—This mine, at North Lawrence, seven miles west of Massillon, is on fire. The regular daily rule of the miners before quitting work is to fire cartridges of powder, which bring down the coal to be loaded into cars the following day. When the men entered the mines last Friday morning two of the rooms were found to be on fire. The flames have steadily advanced ever since. The mine being perfectly dry the situation is rendered alarming. The mine is the largest in the valley. All work has been suspended. The rooms were filled with smoke. A force of fifty men was put on duty on the 19th inst. to prevent the flames' progress, if possible; but the squads can do but little—being unable to combat the smoke for more than a few minutes at a time. The slope extends more than three-quarters of a mile underground.

OREGON.

OREGON CONSOLIDATED GOLD AND SILVER MINING COMPANY.—This company has been incorporated at Portland, with a capital stock of $2,500,000. L. D. Brown, M. Hobart, G. W. Penter, W. Alpherson and L. T. Barin are the directors.

PENNSYLVANIA.

COAL.

At a meeting of coal miners at Reynoldstown on the 21st inst., over four hundred delegates from the Clarion and Reynolds districts were present. They represented over six thousand miners, and by a unanimous vote decided to strike for the Columbus scale of sixty-five cents. Bell, Lewis and Yates, the largest operators affected by the strike, are, they say, prepared for a six months siege, and think that at the expiration of that time the cold weather will freeze out the men. The miners of the Rochester district voted recently against striking. In view of the action at Reynoldstown the Rochester men will probably reconsider their vote and strike, hoping by united effort to bring the operators in the Clarion and Reynolds districts to terms.

Thomas Johnston has recently opened up a large deposit of silica rock at Hite Station, on the West Penn road, and erected a plant, where he is now carrying on the manufacture of silica in two grades, No. 1 for laying brick in open-hearth furnaces and blast-furnace work, and No. 2 for puddling and heating furnaces. An analysis of the clay showing 94 per cent. of silica, would indicate that the clay is well adapted to stand severe tests of heat. In the arrangement of the plant much attention has been given to labor-saving methods of handling, so that the cost of production is materially lessened. Shipments of these clays have recently been made to Wheeling, Chicago and other Western points.

The heavy rain of the past week has flooded the mines about Ashland, and work is practically suspended. Reports from other towns through the region show a like condition of affairs, and in many places it will require weeks to pump the water out of the workings and repair the damage done.

PENNSYLVANIA COAL COMPANY.—The fire in No 14 mine of this company, at Pittston, is still raging, but it is believed to have been confined within bounds. It is expected to be extinguished in a few days.

WARRIOR RUN MINING COMPANY.—The heirs of the late Hendrick B. Wright brought suit in Wilkesbarre, on the 21st. inst., against this company for the recovery of royalty on 250,000 tons of coal which, it is alleged, was mined and shipped by that company from coal lands leased from the plaintiff, without having paid the royalties. The complainants ask for an injunction to stop the further mining of coal at the Warrior Run colliery until an accounting is had with the company.

NATURAL GAS.

A syndicate of Pittsburg capitalists has purchased the gas leases owned by George Given. The leases are for between 2,000 and 3,000 acres of land, and extend from the McDonough farm toward Bellevernon. On the McDonough farm is the gasser recently purchased by Carnegie Bros. On one of the farms is the Hoffman well, which has a pressure of over 600 pounds of natural gas. At the head of the syndicate is Mr. James B. Oliver, of the Oliver Iron and Steel Company.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to May 16th, were as follows:

	1890. Gals.	1889. Gals.
From Boston	1,178,994	1,122,891
Philadelphia	46,399,112	44,779,580
Baltimore	3,557,433	1,277,883
Perth Amboy	4,047,231	7,258,854
New York	132,487,665	146,249,697
Total	187,665,435	200,668,905

The oil fields of Butler, Venango and Bradford, on the north, and Washington, Mt. Morris and Eureka, on the south, Allegheny in the center, excepting Eureka and Mt. Morris, have all been pretty thoroughly tested, and drilling has practically ceased in the northern districts. The active drilling is now being done within 20 miles of Pittsburg. It is only within a few years that oil was found within Allegheny County, and it is not a year since the attention of oil men throughout the entire region was drawn to Allegheny by the Arbuckle strike.

Following Arbuckle pool came the Westview. Before that, however, the Duff District and Sewickley attracted considerable attention. After the Ivory well was in good running order, Griffith tapped the Wrildwood oil and gas territory The Davis well, at Cafton, opened with 250 barrels a day. The O'Brien No. 1, at Chartiers, next gave 200 a day. The O'Brien No. 2 is now doing 600 a day. The Vandegrift well, on the Young farm, near Groveton, reached the pay streak only a few weeks ago, and in 32 days, or from April 7 to May 8, inclusive, it has placed to the credit of its owners, it is reported, 35,773 barrels of oil, or a daily output of almost 1,118 barrels. This is the best well ever struck in the county. The present daily production of Allegheny county is about 3,000 barrels. The Baxter has a small showing of oil at 1,500 feet. It has not reached the Hundredfoot. The Breenwell is going in the third sand. The Straw well is through the Hundredfoot and dry. It will go to the third sand.

UTAH.

SUMMIT COUNTY.

CRESCENT MINING COMPANY.—Published notices in *The Record* show that the Crescent company's property is to be sold to satisfy a judgment issued by the Third District Court in favor of the Wasatch Mining Company. Secretary Withey states that the suit pending between the Crescent and Wasatch companies, in which the former is defendant, has not yet come to such a focus as the notice of sale would seem to indicate. No papers have been served on Mr. Withey, as secretary of the Crescent company, regarding such a sale. The

old Wasatch company lately obtained a heavy judgment against the William Jennings estate, but the Crescent company is in no way concerned in this, Mr. Withey says. *The Record* has received notice from the U. S. Marshall to discontinue publishing the notice.

WASHINGTON.

MASON COUNTY.

MASON COUNTY MINING AND DEVELOPMENT COMPANY.—This company has been incorporated at Hoodsport, with a capital stock of $100,000, to develop coal mining. Trustees, John McReavy, James McReavy, J. D. Dow, Vincent Finch and F. H. Whitworth.

OKANOGAN COUNTY.

FOURTH OF JULY MINING COMPANY.—At the annual meeting of this company the following gentlemen were elected as trustees: J. K. Clark, Ed. I. Zimmerman, Chas. Kaufman, of St. Louis; L. G. Phelps, Geo. O. Eaton, Chas. S. Warren and T. H. Kleinschmidt. A subsequent meeting of the directors was held at the First National Bank parlors for the purpose of electing officers, which resulted: President, J. K. Clark; vice-president, Chas. Kaufman; treasurer, L. G Phelps; secretary, C. B. Garrett. John Welsh was chosen to be superintendent.

On the property, which is near Ruby City, the main shaft is now 90 feet deep, and a fissure vein about 12 feet wide runs north and south, and carries high grade sulphurets and gray copper. At 72 feet in the shaft levels have been run in 90 feet north and about 180 feet south, and in the north dritt a chute of ore, richer than that found in the workings at the 32-foot point, has been struck. A new shaft has been started 50 feet from the old prospect shaft, and this will be put down 200 feet. The machinery for the new hoist is now on the ground.

PIERCE COUNTY.

TACOMA SMELTING AND REFINING COMPANY.—These works have a capacity of 200 tons per day, and the most approved machinery. The general manager, Mr. Rust, has just returned from Alaska, where he has made a contract for a large quantity of ore. Contracts for ores from South America and British Columbia he is said to have also made. The lead ores will be secured from mines in the Cœur d'Alene District, Idaho, owned by Mr. Dennis Ryan, of St. Paul, who is interested in the smelter.

WYOMING.

LARAMIE COUNTY.

A movement is on foot to develop the copper mines at Silver Crown. It is stated that improved machinery is being shipped in by a Boston company for working the ore.

At a recent meeting the board of trade trustees, of Cheyenne, selected J. C. Baird and A. J. Parshall as the representatives of that board on a committee to visit Pueblo and Colorado, and collect data about blast furnaces, rolling mills, etc., as Cheyenne intends to avail itself of the iron ore only a few miles away.

FOREIGN MINING NEWS.

BELGIUM.

The International Miners' Conference opened in Brussels on the 20th inst. A Belgian delegate welcomed the foreign delegates. The conference was organized by the election of officers.

CUBA.

A committee of Americans consisting of Edmund D. Smith, Clarence M. Clark, David H. Thomas, E. D. D'Invilliers and S. H. Chauvenet, accompanied by the following mining, railroad and engineering experts: W. J. Kattle, Capt. E. D. Greene, Edward Gaynor, John Gaynor and John Cooper, were recently presented to the civil and military governors of the province of Santiago de Cuba. The gentlemen are said to represent an American syndicate of capitalists, and are making examinations with the view of establishing iron works near that city. The visitors were assured by the governors that the American capitalists they represented would receive every encouragement and certain concessions from the Spanish Government. It would be better for this country to allow Cuban ores of all kinds to come in free and let us treat them here.

MADAGASCAR.

Except the two great districts, which have been granted respectively to Messrs. Puperbie and Talbot, no work whatever is being done at this moment on the enormous and unquestionably rich goldfields of Madagascar. All the French engineers, who were working under the orders of the Malagasy Government engineer, have been withdrawn, and a new experiment is being tried in their district. Meantime, scarcely a day passes without fresh discoveries of gold being made. Perhaps the most important is one of the most recent, namely, at Zenoarivo, on the northeast coast, the main value of which lies in the fact that it is outside the chain of mountains which was supposed to be the limit of the Malagasy goldfields, and also that the reef found is not far from the mouth of the river, where there is some kind of a harbor, which would facilitate the landing of machinery.

Of the two great private concessions mentioned above, the latter concessionaire, a Mauritian, has hitherto tried ineffectually to work his alluvial gold on a payable scale, which, in view of the enormous percentage he had to deduct, viz., 10 per cent. to the government and 45 per cent. (or half the remainder) to the prime minister, is not wonderful. He and his associates have come to the end of their means. But M. Puperbie, the other concessionaire, a Frenchman, although he has nominally the same terms, is in a different position. His American engineer has found no less than four payable reefs on one corner of his concession, and a 10-stamp mill is already being erected upon one of them. His report is that the surface lodes will give from 4 oz. to 5 oz. per ton. Consequently, M. Puperbie and his four or five friends contemplate putting up another mill of 50 stamps without loss of time, and do not intend at present asking the outside world to subscribe. They keep their own counsel, and no one knows what their private arrangement with the prime minister may be.

MEXICO.

A concession has just been granted for a railway to connect the International Railway with the peaks of Popocatepetl and Ixtaccihantl, the latter of which, until ascended by Mr. Whitehouse, was regarded as practically inaccessible.

In Mexico the erection of smelters appears to be going on apace, as we predicted would be the case if Congress imposed a prohibitive tax on silver ore. Not only are the Mexicans establishing works on their own account, but Americans are doing the same, and in two instances at least smelters are being closed in the States with a view to their re-erection across the border. Already the Mexican journals are thanking the Ways and Means Committee of the House of Congress for their action, and the result of the tax will not be exactly what its promoters intended.

MEETINGS.

Elk Mountain Mining Company, at Central City, So. Dak., May 28th, at 8 P. M.

Hartford Mining Company, at room 22, 303 California street, San Francisco, Cal., June 3d, at 1 P. M.

Horseshoe-Comet Mining at the office of Martin & Mason, Deadwood, So. Dak., June 3d, at 10 A.M.

Humboldt Mill and Mining Company, at room 11, No. 303 California street, San Francisco, Cal., May 26th, at 1 P. M.

Pennsylvania Coal Company, at Dunmore, Pa., June 10th, at 12 o'clock, noon.

Seabury-Calkins Consolidated Mining Company, at Carbonate, So. Dak., June 3d, at 2 P. M.

Silver Coin Mining Company, at Deadwood, So. Dak., June 3d, at 8 P. M.

Silver Hill Mining Company, at room 79, No. 309 Montgomery street, San Francisco, Cal., May 26th, at 12 o'clock, noon.

DIVIDENDS.

Alabama Mineral Land Company, dividend of 5 per cent., payable June 2d, at the Continental National Bank, New York. Transfer books close May 28th and reopen June 3d.

Daly Mining Company, dividend No. 39 of 25 cents per share, or $37,500, payable May 31st at the office of Lounsbery & Co., Mills Building, New York. Transfer books close May 26th.

Little Rule Mining Company, dividend No. 4 of 2 cents per share, or $10,000, payable May 29th at No. 904 Seventeenth street, Denver, Colo.

Ontario Silver Mining Company, dividend No. 168 of 50 cents per share, or $75,000, payable May 31st at the office of Lounsbery & Co., Mills Building, New York. Transfer books close May 26th.

Oro Mining and Milling Company, dividend No. 3 of 20 cents per share, or $20,000, payable June 2d at the State National Bank. Transfer books close May 28th.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Acme, Cal.	10	Mar. 20	May 15	June 9	.03
Alpha, Nev	4	Apr. 5	May 12	June 3	.25
Andes, Nev.	36	Apr. 10	May 14	June 3	.25
Belcher, Nev.	39	Apr. 29	June 3	June 24	.50
Challenge Con., Nev	6	May 14	June 17	July 8	.50
Confidence	16	May 10	June 13	July 2	.75
Con. Imperial, Nev.	27	Apr. 17	May 22	June 11	.05
Del Monte, Nev.	3	Apr. 16	May 22	June 13	.20
Gold Hill, Cal.	9	Apr. 17	May 24	June 10	.25
Gould & Curry, Nev	64	Apr. 28	June 3	June 26	.30
Guasucaran & Cal., C. A	1	Apr. 2	June 3	June 24	10 00
Hale & Norcross, Nev	95	Apr. 9	May 14	June 5	.50
Hartford, Nev	7	Apr. 8	May 15	June 6	.02
Iron Hill, S. Dak.	17	Apr. 19	May 21	June 7	.05
Mexican, Nev.		May 13	June 18	July 9	.25
Morning Star, Ariz.	1	Apr. 30	June 5	June 25	.02
Navajo	20	Apr. 8	May 15	June 6	.15
North B. Isle	17	Apr. 8	May 14	June 5	.20
N. Commonwealth, Nev	3	Apr. 16	May 21	June 12	.25
North Occidental	2	Mar. 31	May 5	May 26	.06
Occidental Con. Nev	6	Apr. 28	June 6	June 30	.25
Ophir	56	Apr. 2	May 6	May 26	.50
Oro Cache, Dak.	2	May 2	June 5	June 21	.00½
Peerless	14	Mar. 28	May 6	May 27	.00½
Seabury-Calkins Con., S. Dak	12	Apr. 5	May 19	June 9	.30
Seg. B. & Mides., Nev.	6	May 5	June 9	June 30	1.75
Sierra Iron, Cal.	7	Apr. 17	May 29	June 23	.20
Sierra Nevada	97	May 10	June 12	July 2	.50
Silver Hill, Nev.	26	Apr. 14	May 20	June 11	.25
Teresa, Mex	1	May 9	June 13	June 30	.10

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 605 and 606

NEW YORK, Friday Evening, May 23.

In the fight for supremacy between railroad shares and mining stocks, the latter, to use a street expression, is nowhere; in fact, it may be doubted whether there are a fight at all. The rail road stock balloon continues inflated to its utmost capacity, and brokers naturally devote most of their attention to watching its ascent. With a very few exceptions mining shares have been neglected and we must add another exceedingly quiet week to the already long list.

Col. Charles E. Taylor, President of the Denver Mining Exchange, has been a welcome visitor at our Exchange during the week. To him is due a great deal of credit for having materially contributed to the prosperity of the Exchange of which he is so worthily the head. He has also been largely instrumental in the listing at the Kansas City Exchange of certain Colorado mines.

He says that he will endeavor to have the May-Mazeppa Consolidated Mining and Milling Company, of which he is the president—one of the "pets" of the Denver and Kansas City Exchanges—listed here. A few good mining properties will not hurt the local Exchange. Colonel Taylor had an interested audience when he described the methods of the Denver Exchange, fully recorded in previous issues of this journal. However, there are already dissenting voices, which claim that if the Denver plan were followed here most of the brokers would probably starve. It would certainly put an end to "bucket shop" methods, and would give legitimate transactions a boom, since it would prevent "washed sales," and, on the listing of a new company, only the certified treasury stock could be dealt in until the property had been put on a paying basis. It is urged by those who are against this method as applied to the New York Exchange that the latter has not enough paying properties on its list to enable more than two or three brokers to live. This candor would be amusing were not its effect more than counterbalanced by the serious reflections which must ensue after this admission. As at present conducted on this Exchange, mining investments are gambling, pure and simple. To say "dabbling in mining shares" is tantamount to saying "speculating on an undeserved rise," although, of course, there are a few stocks which deserve to be traded in.

The Denver plan merits the attention of the Committee on Mining Securities, which to a man expressed itself in favor of any measure that will prove beneficial to the Exchange. Several of its members are inclined to look upon the Denver plan favorably, and, after an impartial review of the various methods in vogue, they should certainly decide on such a course as will bring a legitimate mining market into popularity with the investing public.

A great deal of unnecessary mystery attaches itself to the plans of the Committee on Mining Securities in regard to the listing of the Ruby Silver Mining Company. We are assured that the committee has decided to list the bonds of the company, provided all its titles and papers, which are now in the hands of the attorneys of the Exchange for examination, are found to be flawless.

Alice continues one of the prominent stocks. It is ascertained beyond a doubt that a great deal, if, indeed, not all the buying has been done for Butte people, who, living near the property, are fully informed as to the most recent developments. There is very little stock to be had, but a great deal more has been bought than the official list of the exchange shows, transactions among outside parties being reported. Only 700 shares were traded in this week at $2.35@$2.50. Moulton is a stock which is but little dealt in, and concerning which there have been sundry rumors. One is that the imperfect development of the property has been purposely so, in order to freeze out certain stockholders, notably a certain New York party, who is said to hold between 30,000 and 40,000 shares. The man who is reported to be doing the manipulation is one of Montana's prominent mining men. On the other hand, we are told that this gentleman offered the controlling interest in the Moulton to the Alice people at a low figure and was refused. It may be that those most heavily interested in the Moulton are waiting for the developments in the Alice to prove their property to be a good one. Only 500 shares at 50 cents were sold this week.

Minnesota Iron Company shows 31 shares sold at $85@$83, having closed at the latter figure, as against $81.50 last week.

We note no sales of the copper stocks. These have not been traded in for the past two weeks.

Horn Silver is one of the few stocks which have excited any interest. It has 3,450 shares at $3.15@$3.30 to its credit, and ruled steady during the week. Ontario shows a slight decline in one sale at $45@45.25. This company, as well as the Daly, have declared their usual monthly dividend.

Caledonia was neglected at $2.20@$2.25. Deadwood Terra shows a solitary transaction at $1.35. Homestake advanced to $10, with but 300 shares sold.

The so-called sales of Brunswick Consolidated continue. The stock reached $2.10 at the end.

In our mining news column reference will be found to the Plymouth Consolidated. It opened at $8.50, but steadily declined to $7.50. At the close $8 was asked, with few takers.

Quicksilver, preferred, at $39@$39.50, was traded in to the extent of 470 shares.

Bodie Consolidated at 60@70c. has only one sale. Mono opened at 35c., but closed at 45c. Sutter Creek sold at $1.55 to $1.60, at which 2,325 shares changed hands. Astoria closed at 6c., with reported sales of 5,200 shares.

El Cristo remains very quiet at $1.20@$1.25.

Rappahanocks advanced 1c., and rule steady at 6c.

Mutual Mining and Smelting Company was at $1.55@$1.60.

In the Colorado stocks Leadville Consolidated sold at 10@12c. Little Chief at 30@32c. Freeland was not dealt in. Robinson Consolidated ruled at 45 @50c.

Phœnix of Arizona continues to be by far the most active stock in the market. It opened at $1 30, and advanced steadily to $1.50; 40,755 shares testify that the stock was not neglected. News concerning the company's property will be found in our mining news column.

The Tuscaroras remain neglected. Navajo sold at 15c. and Bell Isle, at the same price, were slightly dealt in.

The Comstocks seem to have been avoided.

Consolidated California opened at $4.30, but advanced to $4.75. Crown Point, $1.90@$2.20. Best & Belcher, $2.70@$3. Gould& Curry, $1.40@1.60. Yellow Jacket, $2.15 at opening, advanced to $2.65. Alta advanced from $1.15 to $1.30. But one transaction in Choliar at $2.50 and Consolidated Imperial at 30 cents. Mexican advanced steadily, closing at $3.30. Only 100 shares of Potosi at $3.80 are reported. Utah was the most largely dealt in, 1,100 shares at 85@95c.

Boston. May 22.

[From our Special Correspondent.]

The market for copper shares the past week has not been so much in the booming order as formerly, but at the same time there is a very steady buying of the best class of shares, which has kept prices up, and in some cases to much higher figures than last week. The public are buying with a great deal of confidence in the future outlook for increased dividends and enhanced values, and we are inclined to believe that no better opportunity to purchase for investment will be offered the present year. Calumet & Hecla still continues to advance, touching $310 this week, and there appears to be ready customers for all that is offered.

Tamarack advanced from $185 to $195½, the highest point on record.

Quincy sold at $96@$97. The advance to $99½ last week was rather too rapid to hold, but it will sell above $100 easily; $120 is the figure set by some for it in 1890.

Boston & Montana has steadily advanced from $53 to $59½, and is certainly booked for higher figures.

Butte & Boston has been very active during the past week, without, however, scoring any advance over the highest price of last week ($25½). It has sold at $22 and up to $24⅛, with reaction to $24. The latest reports from the mine are the 411-foot level east drift, Silver Bow No. 1, increases in width and richness.

Centennial sold up to $38¼. A raid was made on the stock on Monday, causing a decline to $31½; the market soon rallied, however, to $36½ declining to $34. All the reports from the mine are very favorable, showing increasing richness and character of vein, and there is no reason why the stock should not sell at $50 on its present prospects.

Atlantic has ruled steady at $20½ to $21, and is considered good for $25.

Frank in we consider one of the cheapest stocks on the list, and should be selling in the twenties on its merits, instead of $17¾ to $18¾, quotations for the week.

Kearsarge had another boom this week, after elling down to $21, and hanging around $22 to $23. The highest point was $25, and it sold within an eighth of that figure to-day. Its friends are very confident that they have a mine of great possibilities.

Osceola has ruled very quiet at $37 to $38. To-day orders to buy carried it up to $39, the highest point for the year.

Allouez has been quite active, and advanced from 5¾ to 6⅝. Work has commenced at the mine, and some very good rock is coming up from both shafts.

Huron steady at about $4 to $4.25. National dull at $2@$2.12½.

Santa Fe is again on the up grade, advancing to-day to 82½c.

Agent McLaughlin supplements his favorable dispatches from the Santa Fe copper mine with a letter in which he says, May 14: "The mine is looking well, or, at least, the places I have started to work. I have started to sink 207 feet from the main working incline. In the south drift have five feet of ore, two feet of which is good smelting ore, and the other is good concentrating ore. I am down about six feet. I have also started 81 feet from this point further south to cross-cut west. Have about one foot of ore which assays 10 per cent. Have also started 100 feet from top of incline to cross-cut south. Have one foot of smelting ore in this drift.

Copper Falls, an old time favorite, but which has not been quoted on the market for a long while, was trotted out this week at $5 and advanced to $9 on sales of 600 shares.

Pewabic sold at $8.50, Central at $16 and a small lot at $15.

Ridge declined to $1 and Bonanza advanced to 92½ cents.

Sales of Arnold at 95 cents, an advance of 7½ cents.

In silver stocks Catalpa was the leader, advancing from 25c.@60c., reacting to 45c.

Crescent sold up from 12½c.@20c., later at 15c.

Dunkin steady at 70c. and Breece at 47½c.@50c.

Napa Quicksilver sold at $5½, an advance of 50c. per share. Market closed fairly steady.

By Telegraph.—Boston and Montana, $59⅜; Quincy, $100; Calumet, $306; Tamarack, $192; Osceola, 38¾; Franklin, $18⅝; Centennial, $34; Kearsarge, $24¼; Atlantic, $20½; Huron, $5¼; Santa Fé, 95c.; Butte and Boston, $24½.

Kansas City. May 20.

Company.	Opening.	H.	L.	Closing.	Sales.
Argonaut	20½	20½	20½	20½	1,400
Bates-Hunter	30	30	30	30†	45,100
Big Six	17	17	14½	14½	11,400
Brownlow	30†	30†	20†	20†	.....
Cash Gold	27½	28	27½	28	1,500
Clay County	35‡	333†	33‡	33‡	.....
Diamond B	11¼†	12	11¼	12	200
Hard Money	14	14	14	14	7,500
Iron Clad	2 ‡	21†	21†	21†	.....
King Jack	75†				.....
Little Nugget	1.12	1.12	1.12	1.12	500
Little Rule	53	54	52	54	14,400
May Mazeppa	62½	63½	62½	63½	29,100
Minnequa Zinc M. Co	27	28	27	28	6,000
Monte Cristo	12†	12½	12†	12½	100
Morning Glim	52	52	52	52	6,800
Pay Rock	07½	07½	07½	07½†	600
Pelican	27½	27½	27½	27½	8,200
Potosi	35	35	31	30†	13,400
Total					146,200
Pit sales					2,500

† Bid. ‡ Asked. Buyer 30. § Seller.

Minneapolis. May 20.

Company.	Bid.	Asked.
Amazon Iron Mg. Co		$3.50
Amerinan Ruby Mg. Co	.13	.20
Badger Silver Mg. Co	....	....
Bear View S. Mg. Co	....	....
Bessemer Consol. I. M. Co	....	2.10
Big Ox Mg. & Rec. Co	1.20	2.00
Black Hills Tin M. Co	1.00	1.50
Brotherton	....	....
Cent. Mont. Placer M. Co	....	....
Champion Con.	....	....
Comstock M. Co. Mich	....	1.75
Deer Lodge Mg. & Sm. Co	....	.20
Dot Iron Mg. Co	.45	1.00
Fairview S. Mining Co	....	.50
Galena Silver Mg. & M. Co	....	.15
Getcagumee G. & S. Mg. Co	....	....
Glengary S. Mg Co., Mont	1.10	1.25
Gogebic Iron Mg. Co	....	3 50
Iron Duke Mg. Co	2.50	3.50
Iron Mountain	....	....
Kakabeka	....	....
Kaministagua I. Mg. Co	....	.05
Keystone Mg. Co	....	1.00
La Belle Mg. Co	2.00	3.00
Lakeside I. M. Co	....	....
Mil.-Mpls. Iron Mfg. Co	....	....
North Pabst I. Mg. Co	....	.15
North Shore S. Mg. Co	....	....
N. W. Coal Mg. Co	2.50	3.00
Old Veteran G. & S. Mg. Co	....	....
Pheonix Iron M. Co	.90	2.00
Phoenix Iron Works	*35.00	*45.00
Silver Arrow	.09	.10
Silver King Mg. Co	....	1.00
Sunrise M. & M. Co	....	....
Thunder Bay G. & S. M Co	.90	1.00
United Iron & Land Syndicate	1.50	2.75
White Fish Lake Mg & Mfg. Co	....	1.00
White Spar Mica Mg. Co	.90	1.50
York Iron Works	30.00	40.00

* Actual sales.

Denver. May 19.

(From our Special Correspondent.)

The market has experienced quite a change for the better during the past week, and as a result there has been a decided increase in the daily volume of business. Several stocks that have been stuck fast in the rut for two months or more developed unlooked-for activity. A bull movement all along the line is almost a certainty, and it will help more than anything else to restore public confidence. A great deal of money has been tied up in dead stocks all spring, and holders of those stocks were gradually becoming not only discouraged, but disgusted with the monotony of the situation, and many of them positively refused to make any further investments until they were given an opportunity to realize something from their holdings. It looks now as if the market had struck a current that would surely carry it upward, and the situation looks so promising that everybody is feeling very much encouraged. The features of the week were sharp advances in Bates-Hunter, Cash-Aspen, United Big Six and John Jay, and the calling of the reorganized Brownlow. Claudia J. took a little bulge at the close of the week which promises to develop into a lively movement during the coming week. Reports from all listed properties are very encouraging, but the roads are still in bad condition and shipments have been seriously retarded.

The Little Rule will pay its third monthly dividend of two cents per share on the 29th inst. The question of listing a number of our best stocks on the New York and Boston exchanges is being agitated, and some steps will undoubtedly be taken to that end. Such an arrangement would be of benefit to this market, as it is thought it would attract Eastern capital and turn the attention of investors toward our stocks, and this is precisely what we need here.

On Thursday of this week a Clearing House will be put in operation, and after that date the obituaries of a few "shoe-string" operators will be written. It will also bring about the death of "laundry" business, and forever stop the circulation of worthless checks. Some of the latter are now in possession of certain brokers who are preserving them for their artistic autographs, and in the hope that they may some day be able to dispose of them to a dime museum as curiosities.

Everybody is anxious to see what effect the Clearing House will have on the general volume of business. It may cut down the daily transactions very materially, but it will bring a more respectable class of brokers on the floor, and the public can rely on the trades being genuine. Nothing further has been done in regard to the new building. The bonds are ready, but have not yet been placed. President Taylor, who is now in Washington, will, no doubt, place the bonds before he returns.

Dividend No. 4, of the Oro Mining & Milling Company, 20c. per share, will be paid at the State National Bank, Denver, on June 2d, 1890. Books close May 28th.

Prices and sales during the week ending May 19th:

Company.	Opening.	H.	L.	Closing.	Sales.
Alleghany, Colo	27	29*	26	26*	5,400
Amity, Colo	10	12*	10	12*	20,600
Bangkok, C. B., Colo	12	13*	11	14†	8,500
Bates-Hunter, Colo	27*	32	27	32†	26,300
Brownlow, Colo	....	22†	15	20†	21,800
Calliope, Colo	26	45†	42b	43	4,900
Clay County, Colo	38a	40a	25b	29b	.....
Emmons, Colo	20*	26†	20	26b	21,018
Hard Money, Colo	09*	10	07	10	13,800
John Jay, Colo	26½†	35†	26½	32	36,400
Little Rule, Colo	51*	51*	50	50	8,400
Matchless, Colo	117b	200a	100b	200	.....
May-Mazeppa, Colo	60	67*	60a	61	21,100
Mollie Gibson, Colo	40	50a	37b	55	100
Oro, Colo	500	675b	400	500	100
Pay Rock, Colo	06½	08†	06½	07	18,800
Puzzler, Colo	20	23*	18	22	25,500
Reed-National, Colo	58	60	57	60	2,200
Rialto, Colo	11	11	10	10	1,100
Silver Cord, Colo	38b	38	35	35b	.....
Whale, Colo	30	39½	29	29½	1,900
PROSPECTS.					
Argonaut, Colo	21*	21	17b	23	800
Aspen United, Colo	13*	24†	10	10	99,400
Big Indian, Colo	21*	21	08b	20	8,600
Big Six, Colo	14	20*	13	20b	21,400
Cash, Colo	22	24	20½	24	83,100
Claudia J., Colo	09½b	14†	09	12	22,300
Denver Gas & Oil, Colo	22b	30	21b	21b	88,000
Diamond B., Colo	10*	13†	09	11	42,300
Golden Treasure, Colo	20	22*	19b	22	8,300
Ironclad, Colo	20½	28†	20	25½	15,200
Legal Tender, Colo	08½	10	08¼	09½	97,100
Morning Glim, Colo	53†	53†	48	52	22,600
Potosi, Colo	22*	23*	20	20	15,300
Total for the week					643,600

*Buyer 30. †Buyer 60. a Asked. b Bid.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25.00	$55.00	$65.00
Aurora Iron Co	25 00	7.50	8.00
Champion Iron Co	25 00	$100.00	102.00
Chandler Iron Co	25.00	37.50	40.00
Chapin Iron Mining Co	25.00	30.00	33.00
Chicago & Minn. Ore Co	100.00	110.00	115 00
Cleveland Iron Co	25.00	18.50	19.00
Germania	25.00	11.50	12.00
Jackson Iron Co	25 00	110.00	.....
Lake Superior Iron Co	25 00	67.00	68.50
Milwaukee Iron Co	25.00	5.50	6 50
Minnesota Iron Co	100.00	83.50	85.00
Montreal Iron Co	25.00	9.00	10.50
Norrie (Metropolitan)	25.00	75.00	80.00
Odanah Iron Co	25.00	20.00	22 00
Pittsburg Lake Angeline Co	25.00	170.00	175.00
Republic Iron Co	25.00	45.00	46.00

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Min. Co	....	....	.50
Grayling Gold & Silver Co	$25.00	....	*.55
Michigan Gold Co	25.00	*$1.75	....
Peninsula Gold & Silver Co	25.00	....	....
Ropes Gold & Silver Co	25.00	.....	*2.35

* Actual sales were made at these prices.

PIPE LINE CERTFICATES.

[Special Report by Messrs. Watson & Gibson.]

The course of the oil market for the past week has been one of gradual upward and hardening tendency in prices. The principal advance, which took place on Monday of this week, was credited to Mr. S. V. White, one of the leading stock operators on the street who was said to have seen an opportunity in the oil market to make a turn upon the "shorts" without any large accumulation of certificates.

There is no doubt but what the gradual absorption of oil in the Pennsylvania field means an equal cancellation of pipe line certificates, and should mean an equal advance in the price of this commodity, but the market is confined to such narrow limits and trading in it is so excessively

limited that we cannot advise customers to touch it at the present time.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
May 17.....	87¾	89¼	87⅜	89¼	115,000
19.....	89⅜	94⅛	89⅛	94⅛	334,000
20.....	94	96¼	93½	95	261,000
21.....	94¾	94⅞	93½	93½	1 0,000
22.....	92¼	92½	91¼	92⅛	150,000
23.....	92¼	94	92¼	94	90,000

Total sales in barrels..... 1 070,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
May 17.....	87¼	88⅜	87¼	88⅜	85,000
19.....	88¾	93⅜	88¾	93⅜	313,000
20.....	94¾	96½	93½	94¾	472,000
21.....	94¼	95⅝	93½	93⅜	213,0 0
22.....	93	93	91½	92	95,000
23.....	92	94⅛	91⅞	94	248,000

Total sales in barrels..... 1,426,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 23.

Statistics.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending May 17th, 1890, compared with the same period last year:

Regions.	May 17, 1890.	May 18, 1889.	Difference.	
Wyoming Region.Tons	387,588	358,148	Inc.	29,440
Lehigh Region ... "	136,322	123.937	Inc.	12,385
Schuylkill Region. "	193,187	197,331	Dec.	4,144
Total.....	717,097	679,416	Inc.	37,681
Total for year to date..	10,598,597	10,837,913	Dec.	239,316

STATEMENT OF ANTHRACITE COAL SHIPMENTS for month of April, 1890, compared with the same period last year. Compiled from returns furnished by the mine operators.

	April, 1890.	April, 1889.	Difference.	
Wyoming Region.Tons	1,299,657	1,148,454	Inc.	151,202
Lehigh Region "	485,363	476,201	Inc.	9,161
Schuylkill Region "	794,326	649,542	Inc.	144,783
Total.....	2,579,347	2,274,199	Inc.	305,148

	For year. 1890.	For Year 1889.	Difference.	
Wyoming Region.Tons	4,392,200	4,783,122	Dec.	390,921
Lehigh Region.... "	1,781.795	1,742,341	Inc.	39,454
Schuylkill Region. "	2,649,843	2,571,989	Inc.	77,853
Total...	8,823,839	9,097,453	Dec.	273,613

The stock of coal on hand at tide-water shipping points, April 30th, 1890, was 827,424 tons; on March 31st, 1890, 992,309 tons; decrease, 164,885 tons.

PRODUCTION OF BITUMINOUS COAL for week ending May 17th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.....	1,482	46,268	32,299
Cumberland, Md.....	‡74,356	1,428,816	1,141,542
Barclay, Pa.....	‡2,201	53,004	44,503
Broad Top, Pa	7 728	305,522	153,955
Clearfield, Pa.....	69,403	1,527,123	1,172,937
Allegheny, Pa.....	25,142	522,430	356,109
Beach Creek, Pa.....	*39,518	741,694	502,596
Pocahontas Flat Top.....	39,635	747,466	578,105
Kanawha, W. Va.....	‡28 432	786,200	598,039
Total.....	288,337	6,059,722	4,581,085

*Week ending May 15.

WESTERN SHIPMENTS.

Pittsburg, Pa.....	13,445	359,907	232,508
Westmoreland, Pa.....	14,187	667,659	567,033
Monongahela, Pa.....	12,071	114,955	81,694
Total.....	39,703	1,142,521	881,235
Grand total.....	328,040	7,202,243	5,462,320

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending May 17th, and year from January 1st, in tons of 2,000 lbs.: Week, 97,808 tons; year, 2,097,978 tons; to corresponding date in 1889, 1,705,926.

‡ Estimated.

Anthracite.

The anthracite coal market may be described as in a very quiet though satisfactorily firm condition. During the past week there has been no unusual activity, and the demand keeps fully up with the supply at full rates. A good deal of coal has, until within a few days, been moving on April contracts. The expected increase in price at the next meeting of the sales agents has had no appreciable effect on the market other than to increase the prevailing confidence in the present state of trade and the belief that the summer will pass over without any reaction from the present quiet and firm tone.

Referring to the apparent difference or proportionate discrepancy between the tonnage shipment up to May 17th and the tonnage award for the month (2,500,000 tons), it is satisfactorily explained that it will be adjusted without any appreciable effect. Overshipping has of late been rare, and only one concern is said to have shipped much more than it was entitled to.

These questions of tonnage will be settled at the meeting of the sales agents on the 27th inst., as will the output for June. It is about concluded that the increase in prices will be 15 cents per ton on broken, egg and chestnut, and 25 cents on stove. The demand for June will about reach 2,750,000 tons, and that, it is expected, will be the limit. The fact that all the April-May coal has been delivered will make this quantity necessary. With the expected upward tendency broken and egg are very firm, but pea is weak and will be weaker before it picks up.

The f. o. b. quotations of the large companies are: Broken, $3.40; egg, $3.40; stove, $3.50; chestnut, $3.25. Individual operators are not going much lower, except where small concessions are made for large contracts on suitable terms; in fact, on some sizes certain of the independent operators are holding even above the company's rates.

Bituminous.

Very little new coal is yet being sold. Orders, however, are quite as plentiful as could be expected, and the firmness in prices imparts a feeling of security to the market. Cars are short and everybody is shipping as much as the facilities will allow. Freights at Baltimore to Boston have advanced 10 cents, to $1.30, and the vessels have been trying to increase this 10 cents more yet. In this they will hardly succeed, as vessels are freer now and can be secured at Philadelphia, Boston, Salem and Portsmouth from 5 cents to 10 cents lower than at last writing.

Prices of bituminous are generally very firm, and all the desirable classes of coal are well sold up. The competitive operators have about all they can manage, and some of them will find it difficult to deliver all their contract obligations. Indications are that those wanting fair coal will have to pay full prices.

Stocks are none too large to meet actual consumption.

The expected labor trouble throughout the coal mining regions has been averted until the fall. Several of the mine-owners, however, work significantly and nod their heads when they hear this assertion. They profess to have advice of a different state of affairs. In two of the considerable coal mining interests, where the men have invariably been defeated in their strike contests with their employers, it is plainly stated that the men have point-blank refused to obey the mandate of the Federation of Labor to join in a general strike. They are earning good wages, appear to be contented and refuse to strike for any eight-hour movement when they generally work less than eight hours now.

Pool prices for bituminous are strictly lived up to all round, as follows: At Baltimore, Newport News and Philadelphia, f. o b. $2.60; in New York harbor $3.25 f. o. b., and same at the Amboys, Elizabethport or Jersey City; Sound or Eastern, $3.15 f. o. b.; New York, alongside, $3.50.

Boston.

From our Special Correspondent.)

The anthracite coal market is in good condition at this port. New business is not as large as last week, but the tendency is to firmer prices. The comparative scarcity of vessels still continues and is somewhat of a drawback to trade. The companies generally are asking $3.65 f.o.b. at New York for broken egg and stove sizes, and the Philadelphia & Reading people, who head the list nowadays for the firmness with which they maintain prices, are asking $3.75, and are indifferent sellers at that figure. The individual shippers are getting as much over $3.50 as the reputation of their coal and the exigency of the buyer permit. A large amount of coal is coming forward on old orders, but unless more vessels report at shipping ports in the next few days there will be a large amount of unfilled orders at the close of the month. It is not thought probable that there will be any formal increase in prices. The companies will get all they can, however. Several holidays this month help to curtail production.

Bituminous coal is inactive. The East Boston Ferries contract was taken this second time at $3.87 delivered, which is 20 cents higher, just as I expected, than the first bid. Cumberland coal is slow of delivery, and fairly firm at $2.40 f.o.b. Clearfield coal is in fairly good supply at $2.35@$2.40 f.o.b. There are no contracts of any account not taken.

Freights are somewhat stronger, particularly at Baltimore, where the nominal quotation is $1.25@$1.35, but there are no vessels there. The New York rate is 80@85c., and at Philadelphia $1.05@$1.10. Many vessels are waiting a long time for an ice cargo at Maine ports. It would seem as if there would be a good sized fleet at Baltimore and other southern ports in another week, and that freights would drop. Vessels are unusually slow in loading ice just now because parties are shipping ice which is stacked outdoors in order to get it out of the way first, and it is a slow job loading it. Ice freights are not such a good thing, so far, as skippers thought they would be, but perhaps affairs will be better later on.

The retail trade is unchanged, which means dull. The combination prices nominally hold on hard coal. On bituminous coal the combination price is purely nominal, as the competition from Pocahontas coal will doubtless be met fully by retailers.

The receipts of coal at this port have been as follows:

	For the week 1890.	For the week 1889.	For the year 1890.	For the year 1889.
Anthracite (tons).....	28,694	30,361	423,704	370,394
Bituminous "	19,810	18,746	325,269	323,550
Total.....	48,504	49,107	758,973	693,944

Buffalo.

May 22.

(From our Special Correspondent.)

There is a moderate business being done in anthracite coal at unchanged quotations. No special incidents to report.

Bituminous coal in good demand for propellers, tugs, manufacturing establishments, etc. The labor troubles in the bituminous coal regions has unsettled the market, but the figures given out are nominally without variation from preceding weeks. The supply is about adequate for the requirements of the trade, but the market is bare of some varieties.

Lake freighting on coal not heavy; good demand for vessels for Milwaukee and Chicago, but offerings very light. Vesselmen firm in their views, but shippers will not make an advance in rates to secure tonnage. Duluth rates declined 5c. So many craft are bound to go up light under ore contracts that it looks as if coal capacity would be light for some time. A local newspaper thus describes the condition of affairs: "The coal shipping situation is anything but satisfactory to either carriers or shippers. There is really very little life in the trade. Only one vessel cleared yesterday, and that with a part load, and there was no clearance on Sunday. The difficulty comes from a lack of demand in the West. The eastern demand is good, but nobody wants it up the lakes. The experience of the past two winters appears likely to return the trade to the old dragging fashion that used to embarrass it years ago. The style of the Western dealer was to let the trade take care of itself till about September, then to make a descent in a body to Buffalo and make the lives of shippers miserable till navigation closed. Orders would pour in from all quarters till everybody was wild. By strenuous effort this fashion had been somewhat broken up, and in 1888 especially orders came in so regularly through the season that the business could be handled. Last season's business suffered on account of the tight winter, and then came another that was no better. Still there was no more coal carried over last winter than there was a year ago, therefore orders ought to be as good now as last May, but they are far from it. A well posted shipper thinks that the shipments to Chicago alone from this port will be easily 50,000 tons less this month than for last May. By-and-by the heavy orders will come in, and as soon as the capacity of the mines is reached then there will be a howl, for the West has not learned how to go without coal yet.

The shipments of coal hence by lake from May 15th to 21st, both days inclusive, aggregated only 36,420 net tons, namely: 10,800 to Chicago, 11,100 to Milwaukee, 6,500 to Duluth, 1,200 to Saginaw, 500 to Owen Sound, 700 to Green Bay, 1,420 to Toledo, 600 to Detroit, 800 to Gladstone, 100 to Bay City, 900 to Port Arthur and 1,800 to Washburn; total thus far this season 257,640 net tons.

The rates of freight for the past week were 60c. to Chicago, 50c. to Milwaukee, on contract to Superior, 40c., 35c. to Duluth, 40c. to Saginaw and Washburn, 30c. to Toledo, Detroit and Bay City, 50c. to Green Bay and Gladstone and on private terms to Owen Sound and Port Arthur. Receipts by canal at this port of coal for third week in May, 118 net tons; shipments, 222 net tons.

The steam barge Ohio, coal laden for Duluth, was run into and sunk in 36 feet water on Monday last, in the Sault Ste. Marie River at the mouth of Mud Lake.

The Car Service Association is now working well; the time of detention of cars has fallen from an average of 3.88 days to 1.80 days.

The Reading Railroad Company is receiving about 200 new coal cars per week, from its order for 4,000 cars placed with the Pullman Company of this city.

Natural gas production here is giving out; the decrease of pressure at the wells is very marked, and some of the gushers have in reality collapsed.

The Grand Trunk Railway of Canada on May 15 advertised for 500 tons egg and 1,000 tons stove anthracite coal, to be delivered on cars at Belleville or Brockville, Canada; also for 2,500 tons egg, 6,000 tons stove and 1,500 tons chestnut at International or Suspension bridges. No date is named for delivery of bids.

Chicago.

May 21.

(From our Special Correspondent.)

Trade in anthracite coal during the past week has not materially changed—firmer prices and more confidence may, however, be noted. Chicago operators are, as a matter of course, governed by the Eastern markets, with the exception of one big dealer in our city, who declares his independence and intention to place his product on this market at figures not influenced by any foreign quotations. There seems to be not much encouragement for fresh mining. The limited production anticipated will make itself felt in due course.

We quote former prices, which remain firm and stronger at retail. Large egg, $5.75; small, $6; range, $6; chestnut, $6.

On cars, f.o.b. Chicago: Egg, 4.75; stove, range and chestnut, $5; Lehigh lump $7. Bituminous, per ton of 2,000 lbs.: Green and Sullivan County (Ind.) shaft, $2.25@$2.40; Jackson Hill, $3.25; ditto shaft, $3.25; Hocking Valley, $3; Ohio Central, $3; Erie Briar Hill, $4.10@$4.20; Indiana Block, $2.35; Youghiogheny, $3.25; Sunday Creek, $2.90; Connellsville coke, $5.20.

Pittsburg. May 22.

(From our Special Correspondent.)

Coal.—The situation remains about the same as that of last report. Our rivers are again booming with more water than is wanted for present purposes. The big tow boats are all on their way home, where they will remain until fall. The lower markets have all an abundant supply. Week's shipments light, the pools being bare of coal.

Nominal rates in pools:

Per 100 bushels.		Per 100 bushels.
1st pool.....$4.75	3d pool.....$3.90	
2d pool..... 4.50	4th pool 3.25	

Railroad coal, $5.00@$5.50.

Connellsville Coke.—Trade dull, and many are of the opinion that no improvement need be expected for some time. A good deal of satisfaction is expressed at the Frick settlement; had a strike occurred it would have been fought to the bitter end. Idle ovens: Frick & Co., 2,000; McClure & Co., 400; Raineg & Co., 25; active ovens, about 12,000. Week's shipments west of Pittsburg, 3,470 cars; east of Pittsburg, 1,075; Pittsburg, 1,570 cars. Frick, Schoonmaker and some others made five days; McClure & Co., four. The car supply is good.

Current rates: Furnace f.o.b. at ovens, $2.15; foundry, $2.45; crushed, $2.65.

Freights: Pittsburg, 70c.; Mahoning and Shenango valleys, $1.35; Cleveland, O., $1.70; Buffalo, N. Y., $2.25; Chicago, $2.75; St. Louis, Mo., $3.35; Cincinnati, O., $2.65; Louisville, Ky., $3.20.

FREIGHTS.

From Philadelphia to: Alexandria, †.85; Annapolis, .65†; Baltimore, .60†; Bangor, 100†.; Bath, 1.10@†1.20; Beverly, †1.10@†1.20; Boston, 1.10@†1.20; Bristol, †1.05@†1.10; Brooklyn, †.90; Cambridge, †.1.15@1 20; Cambridgeport, 1.15@†1.20; Charleston, .70; Charlestown, 1.10@†1.20; Chelsea, 1.10@†1.20; Com. Pt., Mass., †1 15@†1.20; East Boston, 1.10@1.120; East Cambridge, 1.10@1.20; Fall River, 1.00@1.05; Gardner, †1.10; Georgetown, †.85; Gloucester, 1.10@1.20; Lynn, 1.15@1.25; Marblehead, 1.10@ 1.20; Milton, †1.25; New Bedford, 1.00@†.1.05; Newburyport, 1.20@1.25; New York, †90; Norfolk, †.50@1 60; Portsmouth, .50@60; Portsmouth, N. H., 1.15@1.20; Providence, 1.00@1.05; Quincy, Pt., *1.15@120; Richmond, .60@.70; Rockport, †1.25@1.30; Roxbury, †1.05@†1.15; Saco, 1.20@1.30; Salem, 1.10@1.20; Sangus, †1.20@†1.25; Savannah, †.80@90; Somerset, 1.05@1.10; Wareham, 1.05@1.10; Washington, †85; Weymouth, †1.15@†1.20.

From New York to: Alexandria, .85; Boston,*1.05; Charleston, 70; East Cambridge, *1.10; Marblehead,*1.10; Portland, †1.10; Portsmouth, N. H., *1.15; Rockport, *1.30; Salem, *1.05, Saugus, *1.22½; Washington, †.85.

From Baltimore to: Boston, Mass., 1.30; Charleston, .70; Fall River, 1.20@1.25; Galveston, 3.00; New Bedford, 1.20; New Haven, 1.20; New London, 1.20; New York, N. Y., 1.15; Portland, 1.30; Portsmouth, N. H., 1.35; Providence, 1.20; Richmond, .70; Salem, Mass., 1.30; Savannah, .90; Somerset, 1.20; Williamsburg, N.Y., 1.15.

*And discharging. †Alongside. ‡And towage. § Flat.

METAL MARKET.

NEW YORK, Friday Evening, May 23.

Prices of silver per ounce troy.

May.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	May.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
17	4.85	47⅛	1.01⅛	21	4.85	47⅛	1.03¼
19	4.85	47⅛	1.04	22	4.85	47 1-16	1.03
20	4.85	47 7-16	1.03½	23	4.85	47 1-16	1.03

Market has been a fluctuating one, with diminished speculation, and the tendency of prices has been downward, owing to pending legislation, with no decisive results.

The United States Assay Office at New York reports total receipts of silver for the week to be 280,000 ounces.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	Price. H.	Price. L.	Sales.
May 17	105⅛	105	70,000
May 19	104⅞	104¾	55,000
May 20	104⅛	103⅞	97,000
May 21	104	103⅛	123,000
May 22	103⅛	....	50.000
May 23	104½	103⅛	310,000
Total sales			705,000

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount, and it remained at 3 per cent. During the week the bank gained £71,000 bullion, and the proportion of its reserve to its liabilities was raised from 41·97 to 42·13 per cent., against an advance from 37·34 to 42·16 per cent. in the same week last year, when its rate for discount was 2½ per cent. The bank on the 22d inst. lost £125,000 bullion on balance. The weekly statement of the Bank of France shows gains of 11,000,000 francs gold and 2,175,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .80	$ 82
Mexican dollars	.79	.81
Peruvian soles and Chilian pesos	.74	.75⅛
English silver	4.86	4.90
Five francs	.94	.95
Victoria sovereigns	4.87	4.90
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	103	104

Copper.—The strong feeling and firmer tendency of values reported in our last weeks issue have become more established and pronounced during the week just passed, especially in regard to lake brands the consumptive demand for which is indeed highly satisfactory. Regarding the important question of stocks, it is understood that in producers' hands these are very light. The recently imported sales by the banker holders have also very greatly reduced the quantity warehoused on their account, and while a certain quantity is still controlled by other speculative operators, the total stock has now been reduced to normal proportions, and if the *bona fide* consumptive demand continues as good as it is at present the accumulated stocks must of necessity be gradually absorbed as there can be no doubt that for the present at any rate the consumption of lake copper is in excess of the production. The prices now ruling for lake brands are 15c. bid, while sellers are asking 15¼c., and are even unwilling to sell largely at that.

The condition of affairs as regards other descriptions of copper is not quite so encouraging, as is clearly evidenced by the abnormally large difference in the market values of such kinds, in comparison with the prices realized for lake brands, and the following may now be regarded as present quotations: Arizona ingots at 13·50@13·75; casting brands at 13@13·12½.

The European markets have developed renewed activity during the week, and an advance of about 15s. per ton has to be recorded for the week in the London market prices for Chili bars and G. M. B. copper. During the whole course of the week the market has evinced a rising tendency, and whilst the closing quotations last Friday stood at £52 12s. 6d.@£52 15s. spot and £53@£53 2s. 6d., to-day's latest cabled quotations are £53 7s. 6d. @ £53 10s. spot and £53 17s. 6d.@£53 three months.

Latest advices report that refined and manufactured sorts are also becoming exceedingly scarce in the English market, and the last quotations for same are as follows: English tough, £57@£57 9s.; best selected, £60@£60 10s.; strong sheets, £64 5s. @£64 10s.; India sheets, £61@£61 10s., and yellow metal, 6¼-½d. per pound.

The exports of copper during the past week were as follows:

	To Antwerp. Copper.	Lbs.	
S. S. Westernland	153 bars.	67,272	$7,393
	To Hamburg. Copper bullion.		
S. S. Wieland	12 bars.	752	3,600
	To Hamburg. Copper matte.		
S. S. Rugia	1,057 bags.	117,244	10,000
	To Havre. Copper.		
S. S. La Bretagne	265 bars.	112,100	12,83

Tin.—In sympathy with London our market here has been very inanimate, with speculative business very limited, attention having been diverted for the time being by the other metals offering more scope for speculative manipulation. While the scarcity of spot tin has not as yet been felt much beyond the actual dealers and no short interest exists to be covered, the fact remains undisputed that the shipments on the way or advised from abroad are very light indeed, and unless this condition of things soon alters it cannot be a question of doubt that great scarcity must be experienced before long, always assuming, of course, that the present satisfactory rate of consumption continues. Our closing quotations to-day are spot at 21, May at 21, June at 21·05, July at 21·05.

As previously intimated, the movements in London during the week have been quite unimportant, and the latest quotations received by the cable to day are very slightly different from last week's. Last week's were £94 12s. 6d. to £94 15s. spot, and £95 2s. 6d. to £95 5s. 3 months, and to day's closing prices are £94 5s. to £94 7s. 6d. spot, and £94 17s. 6d. to £95 3 months.

The first direct shipment of tin has arrived at Amsterdam from the Straits. Hitherto the metal went to London.

Lead.—Owing to the passing of the McKinley Tariff Bill through the House of Representatives without any amendment of the clause imposing the duty on lead contained in Mexican silver-lead ores, the lead market has been considerably excited and prices have marked an important advance, as high as 4·40 having been touched during the week. Afterwards, however, owing to large realizations by parties who held back until the effect of the "good news" was fully felt, there has been a little relapse and the latest quotations are about 4·30.

The ultimate fate of the tariff bill is, of course, not yet settled, and it is quite possible that very important amendments may be made in it before it passes the Senate and receives the signature of the President.

London quotations remain the same as last week at £13 for Spanish and £13 5s. for Spanish lead.

The Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "Early in the week lead was firm, and subsequently became strong and higher after the defeat in the House of Representatives of the amendment relating to foreign ores. Sales foot up 750 tons at 4@4·25 cents, with consumers liberal buyers. At the close the market is easier at 4·15 cents asked."

The St. Louis Lead Market.—Messrs. John Wahl & Co., telegraph us as follows: "Since our last report lead has advanced from $3.90 to say, nominally, $4.15. The Mexican ore tariff, as passed by Congress, has created quite a stir, and buyers, both speculators and consumers, have shown an unusual amount of anxiety to procure lead. At the close the market is a little easier, $4.15 asked and $4.10 bid."

Spelter is very firm, with spot metal exceedingly scarce. We quote prime Western at $5.40.

Antimony is also very firm, and there is no increase in supplies, which have continued very scanty for so long. We quote Hallett's at 19½; Cookson's at 24.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, May 23.

Pig Iron.—Dealers in this market are inclined to look more hopefully on the situation, although nothing has happened to justify this unless it be the reports that Southern furnaces, having all the orders they can attend to, are unwilling to accept prices which, it is said, they would have taken some weeks ago. Our reports from other iron centres are rather less encouraging this week, and it would seem as if somewhat lower prices may be marked before the advance comes, which all look for in the second half of the year. No sales of any magnitude have occurred, but a jobbing trade which in the aggregate amounts to a fair quantity is reported, and the inquiry has been considerable, although, as we have already stated, it has not resulted in heavy trading. From the tenor of the communications received from consumers it is evident, so dealers say, that they consider the bottom to have been reached. Our reports, as above mentioned, do not quite confirm this.

Our quotations are: Southern iron, No. 1, $16.75 @$17.50; No. 2, $16.00@$16.50. No. 1, Northern, $18@$19, and No. 2, $17@$18.

Scotch Pig Iron.—Scotch pig was traded in to the extent of some 350 tons, but the market continues quiet as for some time past. Nominal quotations are: Eglinton, $19@$19.50; Dalmellington, $20@$21.50; Coltness, $25.

Steel Rails.—This market has been characterized by an almost absolute quiet. Large sales in the East have not taken place for a long time past, although we hear of a few small sales at $32 at mill. Rails are weaker, it being agreed that $31@ $31.50 is a very fair price. The report of a lot of 8,200 tons sold by the Chicago mills, Duluth delivery, is the only sale reported. The price is said to have been nearer $33 than $34.

Spiegeleisen and Ferro-manganese.—There has been no inquiry for these articles. We quote for future delivery, $31@$32 for 20 per cent., spiegel, and $78@$80 for ferro-manganese, 80 per cent.

Merchant Steel.—A week attended by quite an improvement is reported in merchant steel. Prices have not materially changed, and we quote this week: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2¾c.; open-hearth spring, 2¾c.; tire steel, 2¾c.; toe calks, 2¾c.; flat file, 4¾c.; mill file, 5¼c.; taper file, 7¼c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—No appreciable change, either as to prices or as to volume of business, can be reported, a fairly good trade going on. Our quotations are: Universal plates, 2·20; bridge plates, 2·15@2·20; angles, 2·15@2·20; tees, 2·55; beams, 3.10.

Tubes and Pipe.—The usual amount of business is going on, uninterrupted by the strike at the National Tube Works at McKeesport, Pa., to which we referred last week. It is expected that difficulties will be amicably adjusted within a few days.

The meeting of the Association has taken place, and in consequence prices remain as last quoted. Ruling discounts on car lots are 47½ per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47½ on lap, galvanized; 40 on 1¾-inch boilers; 50 for 2 to 4-inch, and 52½ on larger than 4-inch; casing, all sizes, 50 per cent.

Rail Fastenings.—Fastenings continue very dull. A few small sales are reported. We quote spikes 2·05c.; angle plates, 1·90c.; bolts and square nuts, 2·70c., and hex. nuts, 2·95c.

It is said that hereafter fastenings will be quoted per joint complete, that is, it will include two angle plates and four bolts. This will not enable buyers to form an idea of what they are paying per pound as heretofore. Sales of complete joints have been made during the week, quotations being 90c. for steel, and 70c. for iron.

Chicago. May 21.

(From our Special Correspondent.)

There has been of late a good business in car lots of pig iron. Prices remain very firm at the low level previously reported; more of speculative influences may be noted; evidences are that any further decline in prices will place large accounts in store for such purposes. Southern iron and Ohio brands hold their places about evenly, and Lake Superior charcoal irons hold up well; it is said that heavy buying by malleable and car wheel works has not yet begun; neither have the many large Northwestern agricultural works entered the market as yet.

Pig Iron.—The only changes in prices are in Northern irons. Scotch has advanced, and with long buyers of Ohio soft iron prices have been slightly shaded. A moderate decline in locals is noted during the past week; upon the whole the market may be regarded as an expectant one.

We quote to day for cash per ton of 2,240 pounds f.o.b. Chicago, for No. 1 and 2 Lake Superior charcoal, No. 3 for car wheels, and Nos. 4 and 5 for malleable, $20.50@$21; Lake Superior coke Bessemer, $20@$21; No. 1 Lake Superior coke, Bay View, $17; No. 2, $16.50; No. 3, $16; Southern coke, No. 1, $16@$16.50; No. 2, $15.50@$16; No. 3, $15@$15.50; Southern charcoal, $19@19.50; standard Southern car wheel, $24@$25; Ohio softeners hanging rock, $19@$19.50; Jackson county, $18@$18.50; hanging rock cold blast, $26@$28; warm blast, $23@$25; No 1 Scotch, according to brand, $25; American Scotch, $20@$21; Bay View Scotch, No. 1, $17; No. 2, $16.50; Chicago Scotch, No. 1, $17.50; No. 2, $16.50; Emma Scotch, $19@$19.50; Black Band Hubbard Scotch, $20; Hazleton, $20; soft silvery, $18; Wellston, No. 1, $19.50; No. 2, $19; Hamilton, No. 1, $18; Norton, $17.50@$18. Zanesville, No. 1, $18.

Bar Iron.—In this market a good feeling seems to prevail. Dealers are well stocked. We quote prices that appear to be firm: Valley mills, $1.60 "half extra," which is judged to be bottom figures at this time.

Structural Iron.—In this *Fair* City, with business booming in this direction, demolitions going on preparatory to the laying of foundations for still other magnificent structures, it would seem, in so far as Chicago is concerned, that a big demand should be created in this direction. We report numerous inquiries. Figures are as follows: Angles, iron and steel, $2.35@$2.40; universal plates, $2.55; sheared plates, $2.50; tees, $2.70@$2.80; beams and channels, $3.20, f.o.b.

Black Sheet Iron.—Mills are reported all sold out up to July 1st, not quoting for any later delivery; bottom prices are as follows: Mill prices f.o.b. No. 27, $2.90@$3.10. Jobbing prices are for No. 27, $3.50; No. 25 and 26, $3.40, and No. 24, $3.30.

Galvanized Sheet Iron.—A good demand and fair business. Discounts for both cheap and standard brands are now 62½ per cent. on Juniata, and 62½ per cent. on charcoal from store. Jobbing lots according to quality.

Cleveland. May 22.

(From our Special Corresponden t)

Since my last report to you dated March 28th, the iron ore market has been without especial feature. Sales and inquiries have been exceedingly few. Ore is coming down rapidly, and owing to the earlier opening of navigation, there has been more thus far shipped than at the corresponding date last year. Lake freights are: 90c. from Escanaba; $1.15 from Marquette, $1.25 from Ashland and Two Harbors.

These are current Lake freights. These quotations, however, are simply for single trips, and the feeling among vessel-men is very firm and hopeful for the future. If season contracts were now to be made, they could not be gotten at any less than the rates that first prevailed, viz.: $1.10 from Escanaba; $1.25 from Marquette; $1.35 from Ashland and Two Harbors.

There have been some rumors that certain furnace men would ask for concessions on the contract prices of the ores which have been bought for this season, owing to the decline in pig iron. There is, however, absolutely no probability of any concessions being made. Furnace men who bought during the winter at prices then prevailing, a liberal supply of ore, need have no fear that their competitors will now be able to buy at a much less price and so obtain a marked advantage. Such a large proportion of this year's estimated product was sold during the winter, that Lake Superior iron ore men are very little troubled at the present dullness of the market. Rather than force their production and bring down much unsold ore to dispose of at reduced prices, they will work their mines conservatively, and only bring down that which has been sold.

This they can well afford to do, as having disposed already of more than three fourths of their product, they are consequently already assured of a good year's business, and can easily afford to shut off a surplus supply. This they consider a wise policy for the market in general, and also a just one, for the protection of their customers who have already bought largely at higher prices for ore than could at present be obtained.

The above policy, coupled with the fact that the coke companies do not intend to reduce the price of their product, is proof that the market has now reached the bottom. Pig iron must again advance, for, as all producers of this metal stand on the same basis of cost, there is much less likelihood of prices being cut.

Quotations are but little changed, although a decline will be noticed from the extreme asking prices of two months ago, yet the figures as they appear below are practically the same as those at which the large purchases were made during the winter.

SPECULAR AND MAGNETIC ORES.

Bessemer	.66@69	per cent	$6.50@$7.25
"	.60@64	"	5 25@ 6 25
Non-Bessemer	.66@69	"	6.00@ 6.25
" "	.62@65	"	5 00@ 5.75
" "	.57@60	"	4.25@ 4.75

SOFT HEMATITES DRIED AT 212.

Bessemer	.62@65	per cent	$5.25@$6.00
	.58@61	"	5.00@ 5.25
Non-Bessemer	.55@63	"	3.90@ 5.00

Above prices are delivered on docks at Lake Erie ports.

Louisville. May 20.

(Special report by HALL BROS. & Co.)

While there has been a fair volume of business in the line of pig iron trading, during the week under review, still there are no sales of special importance to note. The trades ranging in quantities from carload lots up to 300 and 500 tons at current prices, mainly however, for "brights" and "silveries" of coke metal with a fair run of orders for charcoal iron. The variable condition of the order books of the different furnaces is a noticeable feature, some of the most prominent being unable to book additional orders for nearby delivery, while the reverse is the case with many others. There is no especial change in the matter of prices, which vary according to the temper of the seller. Buyers experience no difficulty in getting their wants supplied for deliveries to suit and at close figures.

Hot Blast Foundry Irons.

Southern Coke	No. 1	14.75@ 15.00.
" "	No. 2	14.00@ 14.50.
" "	No. 3	13.50@ 13.75.
Mahoning Valley, Lake ore mixture		17.50@ 18.50.
Southern Charcoal	No. 1	17.00@ 17.50.
" "	No. 2	16.50@ 17.00.
Missouri "	No. 1	18.00@ 18.50.
" "	No. 2	17.00@ 17.50

Forge Irons.

Neutral Coke	13.00@ 13.50.
Cold Short	13.00@ 13.25.
Mottled	12.00@ 12.50.

Car Wheel and Malleable Irons.

Southern (standard orands)	22.00@ 23.00
" (other brands)	18.00@ 19.00
Lake Superior	22.50@ 23.00

Philadelphia. May 22.

(From our Special Correspondent.)

Pig Iron.—The iron trade has gained a point or two during the past six days. Offers enough have been made by large buyers of forge iron, to impart quite a degree of activity if makers would accept the terms named, which are, $15.50 and $15.75 for standard brands of forge. There is a good deal of iron to be had at these figures, but the brands are not exactly what are wanted. Within the past day or two, several good sized blocks have been contracted for, and makers think that by accomodating their customers with small lots for immediate delivery, they will soon benefit by a hardening tendency. There is also more inquiry and demand for both No. 2 and 1 foundry, the stocks of which, among most consumers, have run down low. Usually the month of June is an active one, and iron makers now think that the indications point to a large amount of pig-iron business in that month. Considerable business is pending for Bessemer.

Foreign Material.—The best offer for 20 per cent. spiegel this week was $30.50, in small lots, but no business has been done. The usual quotations given this week for ferromanganese, ranged between $75 and $80. Brokers expect some heavy contracts in a few days.

Muck Bars.—The manufacturers of muck bars have been obliged to back down from the figures they named a week ago. Buyers are almost out of supplies, but still refuse to place large orders. Quotations are given at $28 to $28.50 delivered, but not much business will likely be done at that price.

Billets.—It is claimed by parties representing large buyers that very little business in billets will be done until prices reach $29. Most manufacturers are quoting $30@30.50, and the statement is made that several good-sized lots of billets will be contracted for before the close of this month at that figure. The probabilities are that $30 will be shaded before much business is done. Manufacturers are quite confident that the general consumptive requirements of the country are heavy enough to bring about stronger prices before midsummer.

Merchant Iron.—A cutting of prices has broken out among some of our Eastern Pennsylvania mills; considerable business has been lost on account of cheaper Western iron coming in. Our home makers say they will hold their own trade, at all hazards. Comparing the business of the month of May with that of April, there has been a larger distribution of iron. Quotations run all the way from $1.75 to $1.90. A good quality of iron has been selling at $1.80.

Sheet Iron.—Several car lot orders have been secured for summer delivery. Users of sheet iron are a little troubled over a statement that has gained acceptance in some quarters, that sheet iron is likely to be advanced. The manufacturers are not hastening to deny the statement, but the probabilities are that card rates will remain as they are. Mills are all running full time.

Merchant Steel.—The local merchant steel makers report quite an active movement among buyers, for immediate delivery.

Skelp Iron.—Sheared skelp has dropped a tenth, and a further weakening is predicted by two or three parties who are in the market to-day for large lots. Grooved skelp is worth 1·75 to 1·85.

Wrought Iron Pipe.—The usual booming activity is reported on all sides, and there is a steady run of orders, looking much like a rush at times. The manufacturers of boiler tubes have their hands full, and old quotations are decreed to stand.

Plate and Tank.—So far as exceptionally large orders are concerned the tendency of prices is downward where makers can be allowed some latitude as to deliveries; but where small orders only are to be had manufacturers name their own prices, and get them. Heavy ship plates are 2c. to 2·10; flange iron, 3c.; steel ship plates, 2·30, with shadings for large orders.

Structural Material.—The market is fairly active, and prices are firm at the usual quoted rates. Angles, 2·15; beams, 3·10.

Steel Rails.—Quotations are given to-day at $31 to $32.50, according to size of order. No very large orders have been offered here within a few days, but makers expect to hear from railroad builders for large lots early in June.

Old Rails.—Quotations are given at $23.50 to $24, delivered. Scarcely any business has been done this week.

Scrap.—No. 1 scrap is wanted at $22, but several lots are being held at 50c. to $1 higher.

Pittsburg. May 22.

(From our Special Correspondent.)

Raw Iron and Steel.—Our report last week stated that we believed the bottom in prices had been reached, a fact which no one will now deny. When Bessemer pig touched $17@$17.25, you may make up your mind that an advance was not far off, while certain parties were preaching $16 Bessemer, giving as their opinion it would touch that figure before there would be any upward movement. The ENGINEERING AND MINING JOURNAL ran counter to their opinions by reporting a sale of 5,000 tons Bessemer at $18 cash; in to-day's report we furnish other sales at a further advance. A well-informed dealer has this to say: "There seems to be a decided change in the raw material market during the week. Bessemer metal, which sold a few week ago as low as $17.25, has advanced 75c. to $1 per ton and sales have already been made at $18.50, Pittsburg, by city furnaces and at $18, Valley furnace, while the best makers in the Mahoning Valley are now holding at $18.50 and declining to sell for late deliveries even at this price. Mill iron has already stiffened up, sales having been reported at $15.25 per ton Pittsburg." Steel billets have advanced in sympathy with metal; sales have already been made at $28@$29, a material advance, with one leading firm asking $30. All the Wheeling mills are reported well sold up, and holding firm at $28@$28 50 at works. The demand for rails is still very heavy, and recent advices from New York show that 1,200,000 tons have already sold for delivery this year, which is between 400,000 and 500,000 tons in excess of last year at same time. From reliable sources it is learned that Allegheny Bessemer has booked orders for about 100,000 tons, which should help the metal market considerably, as they will no doubt be large buyers, as they do not manufacture pig metal themselves. Carnegie Bros. & Co. are also reputed well filled with orders for the next five or six months, and also the Illinois Steel Company. Both of these parties are reputed to be making some purchases of pig metal. The reports from all mills are very encouraging, and they are all filled with work, with a great deal of business offering, so that the general outlook for a large business is very encouraging.

Coal and Coke Smelted Lake Ore.

3,000 Tons Bessemer	$17.50 cash.
3,000 Tons Bessemer	18.00 cash
2,500 Tons Bessemer	17.75 cash.
1,200 Tons Grey Forge	15.00 cash.
1,000 Tons Mill	15.00 cash.
1,000 Tons Bessemer	17.65 cash.
1,000 Tons Bessemer	17.50 cash.
1,000 Tons Mill	15.00 cash.
1,000 Tons Bessemer	18.00 cash.
1,000 Tons Bessemer	18.00 cash.
1,000 Tons Bessemer	18.00 cash.
150 Tons No. 1 Foundry	16.50 cash.
100 Tons No. 2 Foundry	16.50 cash.

Coke Native Ore.

200 Tons Mottled Wheeling	14.00 cash.
100 Tons No. 2 Foundry	16.75 cash.
100 Tons No. 2 Foundry, all ore	17.50 cash.
75 Tons No. 2 Foundry	16.50 cash.
75 Tons No. 1 Foundry	18.00 cash.
50 Tons No. 1 Foundry	18.25 cash.

Charcoal.

100 Tons Cold Blast	29.25 cash.
75 Tons Warm Blast	23.50 cash.
50 Tons No. 2 Foundry	22.50 cash.
50 Tons No. 2 Foundry	22.00 cash.

Muck Bar.

1,000 Tons Neutral	27.50 cash.
1,000 Tons Neutral	28.00 cash.
500 Tons Neutral	28.52 cash.
600 Tons Neutral	27.00 cash.

Steel Wire Rods.

500 Tons American Fives ..... 38.50 cash.

Steel Slabs and Billets.

1,500 Tons Billets..... 28.00 cash.
1,000 Tons Billets..... 28.50 cash.
1,000 Tons Billets..... 28.00 cash.
750 Tons Slabs..... 28.50 cash.
500 Tons Slabs..... 28.25 cash.

Steel Bloom Ends.

1,500 Tons Bloom Ends, extra..... 21.50 cash.

Ferro-Manganese.

150 Tons 20 per cent., f.o.b., Baltimore ..... 31.00 cash.
75 Tons 10-12 per cent., f o.b , Baltimore .. 28.50 cash.

Spiegel.

300 Tons Sheared Iron ..... 2.10 4 ms.
150 Tons Wide Grooved..... 1 72½ 4 ms.
100 Tons Narrow Grooved..... 1.67½ 4 ms.

Old Iron and Steel Rails.

450 Tons American Ts..... 23.00 cash.

Prices.

Coke or Bituminous Pig—	
Foundry No. 1..	$17.50@18.00
Foundry No. 2..	16.25@16.50
Gray F. No. 3..	15.25@15.50
" No. 4..	15.00@
White..	14.25
Mottled.....	14.25
Silvery.....	17.50@19.50
Bessemer	17.75@19.00
Low Phos.....	26.00@26.50
Charcoal Pig—	
Foundry No. 1..	23.50@24.50
Foundry No. 2..	22.00@22.75
Cold-Blast.....	25.00@29.00
Warm-Blast...	24.00@25.00
10 + 12% Spiegel f.o.b. Baltum	23.50

20% Spiegel at seaboard.....	$30.00@31.00
Muck-Bar...	28.00@28.25
Steel Blooms..	28.00@28.50
Steel Slabs....	28.50@28.75
Steel Cr'p Ends	20.50@21.00
Steel Bl. Ends..	20.50@21.50
Ferro-Man., 80%, seaboard, 80.00	
Steel Billets...	28.50@28.75
Old Iron Rails..	23.00@23.50
Old Steel Rails.	21.50@
No. 1 W. Scrap.	20.00@20.50
No. 2 W. Scrap.	....@17.50
Steel Rails.	34.00@35.00
" light sec..	34.00@37.00
Bar Iron, nom..	1.85@ 1.90
Iron Nails.....	1.90
Steel Nails.....	1.90
Wire Nails.....	2.30@ 2.35

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, May 23.

Heavy Chemicals.—There have been more inquiries for chemicals during the week, but the amount of actual business transacted has not been very great. There are no heavy stocks here, but on the other hand there can not be said to be a scarcity except in the case of caustic soda, of which it is said there are not 100 drums on the spot. Prices show no great change. We quote this week:

Caustic soda, 60 per cent., 2¾@3c.; 70 to 74 per cent. 2·50@2·65c.; 74 to 76 per cent., 2·55@3·62c.

Caustic soda ash, 1·50@1·55c.

Carbonate soda ash, 48 per cent., 1⅝@1⅝c.; 58 per cent., 1·45@1·50c.

Bleaching powder, 1·35@1·50c.

Sal soda, 87½@92½c. There have been some reports afloat to the effect that the Liverpool market in sal soda was quoting 1·05 for shipments, and that 1c. had been declined.

Acids.—The market in acids offers no feature of any interest. The sharp fighting so prevalent but a short time ago has, in some degree, subsided, and manufacturers are trying to market their product as advantageously as possible, although prices still rule low. There was a report that a prominent manufacturer was contemplating a change of location for his works, but inasmuch as the gentleman alluded to emphatically denies it, and says that, on the contrary, they are about to enlarge the capacity of the works, the rumor was evidently unfounded.

We see nothing to justify any change in our last week's quotations, and we accordingly repeat them.

Acid, per 100 pounds in New York and vicinity: Acetic, $1.75@$2.25; muriatic, 18-degree, 80c.@$1.25; muriatic, 20-degree, 90c.@1.50; muriatic, 22-degree, 90c.@$1.75; nitric, 36-degree, $2.75@$3.50; nitric, 40-degree, $3.25@$4.50; nitric, 42 degree, $3.75@$4.75; sulphuric, 60-degree, 70@80c., and sulphuric, 66-degree, 85c.@$1.

Fertilizing Chemicals.—A week unmarked by any quotable change has passed in the market for fertilizers. There has been some inquiry and dealers are hoping for a good Fall season.

We quote high grade dried blood $1.95@$2. For the low grade the price is $1.85@$1.90. Azotine, $1.95. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.50. Fish scrap, $20@$20.50 per ton. f.o.b. factory. Sulphate of ammonia at $3.05@$3.10 per cwt. Concentrated tankage, $1.80@$1.85. Refuse, bone black, guaranteed 70 per cent. phosphate, $18@$19 per ton. Dissolved bone-black is nominally 95c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln-dried, $6.50@$7 per ton, both f. o. b. vessels at the mines. Freights by sail from Charleston to New York, $2.25@$2.50 per ton. Charleston rock, ground $11.50@$12, ex vessel at New York.

Quotations are for 48 to 52 per cent. sulphate of potash, $1.12½ per 100 pounds for shipments from date; high grade manure salts, basis 90 per cent. sulphate of potash, $2.37½ per 100 pounds.

Mr. Paul C. Tr nholm, of Charleston, S. C., sends us the following interesting statistics, issued under date of the 16th inst., showing the shipments of fertilizers from Charleston, S. C., for the period given below:

September 1888 to April 1889 inclusive.....	172,592 tons.
September 1889 to April 1890 inclusive.....	260,169 tons.
Showing an increase of.....	87,577 tons.

Kainit.—There has been rather more inquiry for kainit, which continues at last week's prices, $9.50@9.75.

Muriate of Potash.—Prices are steady with a small jobbing trade going on. About 450 tons arrived this week, and it all went into consumption. We quote $1.77½@$1.85 according to quantity.

Nitrate of Soda.—The market for nitrate is quite firm with $1.75 ex store quoted.

Brimstone.—This market is also strong with prices ruling rather higher than for sometime. Buyers evidently think that the advance has been too rapid, and they are waiting for the excitement to subside, meantime sending in no orders.

We quote this week best unmixed seconds on the spot, $21@$21.50; best unmixed thirds on the spot, $20.50@$21.

Liverpool. May 14.

[Special report by Messrs. J. P. Brunner & Co.]

Although there is a fair business going on in a quiet way in some lines of heavy chemicals, the downward tendency still continues. Soda ash is receiving little attention, and is easier, although at the same time there is not much offering. Nearest values to-day are: Caustic ash 1⅛d.@1½d. Carb. ash 1¼d.@1½d., according to brands. Soda crystals are quiet at £3@£3 5s. per ton.

Caustic soda.—Although there has been a fair number of orders in the market, prices again show a considerable drop, as makers having accumulated stocks, have been anxious to realize. Nearest spot values to-day are: Sixty per cent. £7 5s.@£7 7s. 6d.; 70 per cent., £8@£8 2s. 6d.; 74 per cent., £8 15s.@£9; 76 per cent., £10.

Bleaching powder is quite neglected, and although £5 10s. is nominal spot quotation, this price could be shaded with an order in hand. Chlorate of potash has been depressed, and sales lately made at 4½d., but the tone is rather firmer in consequence of the report that Messrs. Kurtz have joined the "Syndicate," and 4⅝d.@4¾d. are quotations at the close. Bicarb. soda moving off at £5 15s. per ton and upward for one hundred weight kegs, according to brand and quantity, with usual allowances for larger packages. Sulphate of ammonia is better, and £11 5s.@£11 7s. 6d. per ton, are now prices asked for good gray 24 per cent. f.o.b. here, prompt delivery. Perhaps a shade under the lower figure would be accepted for the month.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, May 23.

Bricks.—There is now fewer brick in the market than has been the case for some time, and business has been brisker. A very good outlook is the opinion of dealers, who say that if brickmakers do not again flood the market with their product prices will stiffen and business will improve. There is a fairly good demand for bricks, and more especially for pale, of which there is no adequate supply. We quote this week: Haverstraws, $5.25@$6.75; uprivers, $5@$5.75; Keyports (nominally), $4; pales, $2.50@$3 per M.

Lime.—The supply is still somewhat greater than the demand, but there can not be said to be a very great deal of lime here. No events of any particular importance have transpired during the week, a fair normal trade being all that can be reported. Quotations are: for Rockland common, $1 per barrel; Rockland finishing, $1.20; St. John, common and finishing, 90@95 c.; Glen Falls, common and finishing, 85@$1.10.

NOTES OF THE WEEK.

The Chicago Carpenters and Builders' Association on the 21st inst., resolved to fight the Carpenters' Council to the bitter end. The Executive Committee was instructed to advertise for journeymen throughout the country and to guarantee adequate protection to all non-union men. The committee was also instructed to prosecute vigorously those of the strikers' pickets arrested for raiding jobs and driving away non-union men. It was also decided to adopt an aggressive policy toward the leaders of the strike and the officers of the Carpenters' Council, and the committee was ordered promptly to push these measures to a conclusion. It is maintained by the association that the officers of the Carpenters' Council, who employ pickets and detail them for duty in preventing non-union men from working, can be prosecuted for conspiracy, under the Merritt law.

It is said that the striking carpenters of Boston will make a move in a few days that will surprise the master builders. Many of the members of the several carpenters' unions involved in the eight-hour conflict are of the opinion that a demand should be made for an increase of wages as well as for the eight-hour work day.

IMPORTS AND EXPORTS OF METALS AT NEW YORK MAY 10 TO MAY 17 AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co....		148
Hendricks Bros....	25	50
La Marche's Sons, H....		5
Lewisohn Bros....	50	50
Meyer, G. A. & E..		9
Muller, Schall & Co....		93
Total.....	75	355
Corres. date, 1889..		123
Pig Lead.	Lbs.	Lbs.
Caswell, E. A.....		111
Hendricks Bros...		50
Schultz & Co., A..		98
G. W. Sheldon.....	149	149
Total.....	149	408
Corres. date, 1889..		54
Tin.	Tons.	Tons.
Abbot, Jere, & Co.		50
Amer. Metal Co....		1,015
Bidwell & French.		145
Bruce & Cook.....		10
Crooks & Co., R...		35
Davol & Son.....		15
Hendricks Bros....		26
Lehmaier, S. & Co.		48
Muller, Schall&Co.		520
Naylor & Co.....		730
Nissen, Geo.....		10
Phelps, Dodge & Co....		1,100
Thomson, A. A. &Co....		20
Thomson, D. & Co....		20
Townsend, & Co., J. R....		30
Trotter & Co, N....		50
Total.....		3,460
Corres. date, 1889..		3,824
Tin Plates.	Boxes.	Boxes.
Bruce & Cook.....		33,789
Byrne & Son.....		1,000
Central Stamp. Co.	94	34,563
Coddington & Co...	3,103	41,446
Cohn & Co	308	9,324
Con. Fruit Jar Co.		120
Cormere F. & Co...	473	4,022
Cort & Co..	1,343	55,968
Crooks & Co.....		11,799
De Milt & Co, H R		868
Dickerson, V. D. &Co	2,721	137,870
Haberman, F.		66
Herring, Chas. E.		1,000
Iron Clad Mfg. Co.		379
Lalance & G. M. Co.		4,725
Lazard Bros.....		1,048
Lehmaier, Schw'z &Co...		200
Merchant & Co.....	60	7,259
Mersick & Co.. ..		3,101
Morewood & Co....		31,403
Newell Bros.....		416
Payne, S. H. & Co.		224
Pratt Mfg. Co.....		44,233
Phelps, Dodge & Co	3,964	233,386
Shepard & Co.....		1,219
Taylor, N. & G....		234
Thomson&Co., A.A.	2,518	27,624
Warren, J. M.....		3,031
Wheeler & Co.....	300	9,662
Whittemore & Co.	484	9,307
Wolff & Reesing...	1,452	2,077
Wright, Peter&Co.		227
Total.....	16,820	711,590
Corres. date, 1889..		936,870
Pig Iron.	Tons.	Tons.
Abbott & Co., Jere.		100
Crocker Bros.....	100	400
Dana & Co.....		130
Geisenheimer & Co		76
Irvin, R. I. & Co .		100
Naylor & Co.....		150
Stetson&Co., G. W.		850
Williamson, J. &Co.	200	750
Total.....	300	2,576
Corres. date, 1889..		10,412

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Baldwin Bros. & Co.....		2
Dana & Co		502
Downing, R. F. &Co.		5
Martin & Co		80
Milne, A., & Co..		18
Pope, Jas. E., Jr.		61
Roebling's Sons, J. A.	251	905
Wolff, & Co., R. H.		60
Total.....	251	1,633
Corres. date, 1889..		16,227
Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.	5	489
Bacon & Co.....	18	554
Crocker Bros.....		77
Downing & Co.....		285
E. J. Jacobus.		1
Fuller, Dana& Fitz.		11
Holt, H. N.....		60
Lilienberg, N.....		385
Lundberg, G.....	100	100
Milne & Co.....		234
Muller, Schall &Co.	22	263
Page, Newell & Co		1,079
Wilson, J. G.....		3
Total.....	145	3,541
Corres. date, 1889..		2,655
Scrap Iron.	Tons.	Tons.
Muller, Schall&Co.		18
Samper & Co., S.		186
Stevens, Corvin&Co.....		30
Ward, J. E. & Co..		192
Total.....		426
Corres. date, 1889..		962
Steel and Iron Rods.	Tons.	Tons.
Abbott & Co.....	454	4,687
American S. Co....		465
Bacon & Co.....		73
Carey & Moen.....		192
Cooper, Hewitt&Co.....		371
Dana & Co		257
Downing & Co.....	22	68
Galpin, S. A.....	20	1,066
Grecly & Co. C. S.		35
Hazard Mfg. Co. .	32	139
Jacobus, E. Y.....		2
Lee, James & Co...	260	948
Lundberg, G.....	16	126
Milne & Co.....	28	333
Muller, Schall & Co.	120	507
Naylor & Co.....	300	3,053
Page, Newell & Co.	153	876
Roebling's Sons, J. A.	125	1,363
Schulze, P. R		1
Temple & Lockwood.....		6
Wood & Niebuhr.		25
Wolf & Co., R. H..	163	2,320
Total.....	1,693	16,922
Corres. date, 1889..		22,174
Old Rails.	Tons.	Tons.
Bowring&Archibald.....		140
Frankfort, M.....		3,282
Henderson Bros...		300
Hernsheim, E		350
Mosle Bros.....	123	123
Naylor & Co.....	295	1,083
Sawyer, Wallace&Co....		610
Total.....	418	5,888
Corres. date, 1889..		8,364
Spiegeleisen.	Tons.	Tons.
Abbott, Jere & Co.		2,725
Blakely & McLellan	130	1,684
Crocker Bros..... ..	133	7,941
Crooks & Co, R..		106
Dana & Co..... ..	1,042	9,590
Foley, F.....		50
Geisenheimer & Co.....		228
Hernshime, L.....	768	10,211
Naylor & Co.....	554	8,569
Perkins, C. L.....		1,460
Sachs & Richmond.		2
Whittemore, H. &Co.		25
Total.....	2,627	42,331
Corres. date, 1889...		34,331
Iron Ore.	Tons.	Tons.
Baiz, Jacob.....		67
Bowring & A.....		222
Earnshaw, A.....	215	3,193
Ennis, Andrew.....		438
Flores & Co., R. de		10,223
Johnson & Co., L..	2,700	2,700
Total.....	2,915	16,843
Corres. date, 1889..		7,308

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.	112,000	955,693
Amer. Met. Co., L..		743,625
Barber & Co		13,750
Belmont, Aug. &Co..		957,315
Burgass & Co.....	5,347	171,797
French, Edye & Co.....		135,374
Heidelbach, Sicheimer & Co		672,608
Seamen, S. H.....		66,950
Ward, J. E. & Co.		100,000
Wilms & Thune.		112,004
Total.....	117,347	3,929,116
Corre. date, 1889..		2,728,094
Copper Matte		
American Metal Co.	224,682	1,870,862
Lewisohn Bros..		1,150,168
Nichols, Geo. H....		267,202
Paulsen, Wm.....		1,039,428
Wilms & Thune..		2,848,706
Total	224,682	7,176,366
Corres date 1889.. 10,330,783		

DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last.	Dividends. Total paid.	Dividends. Date and amount of last.
1	Adams S. L., Colo.	$1,500,000	150,000	$10	*	....	$555 000	Jan. 1887 .15
2	Alice, S. C., Mont	10,000,000	400,000	25	*	....	80,000	Dec. 1889 .06¼
3	Alma&Nel Wood C., G., Idah	300,000	30,000	10	*	....	60,000	Jan. 1889 .50
4	American & Nettie, C., Colo.	.....	300,000	...	.....	....	150,000	Nov 1889 .10
5	Amy & Silversmith, S., Mon.	.....	341,419	...	.....	....	247,530	Aug. 1887 12½
6	Atlantic, C., Mich	1,000,000	40,000	25	$280,000	Apl. 1875	$1.00	620,000	Feb 1890 1.50
7	Argenta, S., Nev.	10,000,000	100,000	100	335,000	July 1889	.10	40,000	Feb 1890 .20
8	Aspen Mg. & S., S. L., Colo.	2,000,000	200,000	10	*	....	....	420,000	May 1890 .10
9	Aurora, I., Mich	2,000,000	100,000	20	*	....	....	155,000	Oct 1887 1.87½
10	Badger, S., Oat.	250,000	50,000	5	.....	....	....	37,500	Mar. 1890 .25
11	Bassick, G. S., Colo.	10,000,000	100,000	100	*	....	....	400,000	Mar. 1884 1.00
12	Belle Isle, S., Nev.	10,000,000	100,000	100	.....	....	....	300,00.	Dec 1879 .25
13	Belcher, G. & S., Nev.	10,400,000	104,000	100	2,028,000	Apl. 1890	.50	15,392,000	Apl. 1876 1.00
14	Bellevue Idaho, S. L., Idah.	1,250,000	125,000	10	120,000	Dec. 1889	.25	200.0.00	Jan. 1887 .10
15	Bodie Con., G. & S., Cal.	10,000 000	100 000	100	575,000	Nov 1889	25	1 602,572	Apl. 1885 .50
16	Boston & Mont, G., Mon.	2,500,000	250,000	10	*	....	....	520.000	Jun 1886 .15
17	Boston & Mont., C. & S., Mon.	2,500,000	100,000	25	*	....	....	1,300,000	May 1890 1.00
18	Breece, S., Colo	5,000,000	200,000	25	*	....	....	2,000	Feb. 1890 .01
19	Brooklyn Lead, L. & S., Utah	500,000	50,000	10	*	....	....	127,000	July 1887 .05
20	Bulwer, G., Cal.	10,000,000	100,000	10	130,000	Aug. 1889	.25	175 000	Jan. 1884 .10
21	Bunker Hill & Sullivan, Idah.	3,000,000	300,000	10	*	....	....	150.000	Oct. 1883 .06⅔
22	Caledonia, G., Dak.	10,000,000	100,000	100	505,000	May 1885	.15	152,000	May 1890 .08
23	Calliope, S., Colo.	1,000,000	1	1	.....	....	....	90,000	Apl. 1890 .01
24	Calumet & Hecla, C., Mich	2,500,000	100,000	25	1,200,000	....	....	34,350,000	May 1890 5.00
25	Carbonate Hill, S. L., Colo.	1,500,000	200,000	10	*	....	....	80,000	Apl. 1884 .05
26	Carlisle, G., N. M.	1,000,000	200,000	5	.....	....	....	175,000	Dec. 1888 .12½
27	Castle Creek, G., Idah.	100,000	100,000	1	.....	....	....	51,000	Oct. 1883 .03
28	Catalpa, S. L., Colo.	3,000,000	300,000	10	*	....	....	270,000	May. 1884 .10
29	Central, C., Mich	500,000	20,000	25	100,000	Sept 1861	.06	1,950,000	Feb. 1890 1.00
30	Chrysolite, S. L., Colo.	10,000,000	200,000	50	*	....	....	1,650,000	Dec 1884 .25
31	Colorado Central, S. L., Colo.	2,750,000	275,000	10	*	....	....	406,250	Aug. 1889 .05
32	Confidence, S. L., Nev.	.....	.....	...	306,160	Mar 1890	.75	199,380	Apl. 1889 1.00
33	Cons. Cal. & Va., G. & S., Nev.	21 600 000	216.000	100	108,000	Jan. 1885	.20	3,466,800	Apl. 1890 .25
34	Contention, S., Ariz.	12,500,000	250,000	50	.....	....	....	12,587,500	Dec. 1884 .25
35	"Cop. Queen Cons, C., Ariz.	1,400 000	140,000	10	.....	....	....	210,000	Feb. 1889 .50
36	Crescent, S. L., G., Utah	15,000,000	600,000	25	.....	....	....	228,000	Oct. 1888 .03
37	Crown Point, G. & S., Nev.	10 000,000	100,000	100	2,850,000	Sept 1880	.50	11,584 000	Jan. 1875 2.00
38	Daly, S. L., Utah	3,000,000	150,000	20	*	....	....	1,500 000	May 1890 .25
39	Deer Creek, S., Idah.	1 000,000	200,000	5	*	....	....	20,000	Jun. 1889 .05
40	Deadwood-Terra, G., Dak.	5,000,000	200,000	25	*	....	....	11,000,000	Nov. 1887 .10
41	Derbec B. Grav., G. & S., Cal.	10,000,000	100,000	100	90,000	Dec. 1881	.10	210 000	Oct 1889 .10
42	Dunkin, S. L., Colo.	5,000,000	200 000	25	*	....	....	390,000	Oct. 1889 .05
43	Dunstone, G. S. L., Mont	1,000,000	200,000	5	*	....	....	6,000	Nov. 1888 .03
44	Eclipse, ..., Colo.	1,000,000	100,000	10	.....	....	....	20,000	Nov. 1887 .10
45	Elkhorn, G. & S., Mont	1,000,000	100,000	10	50,000	July 1883	.50	850,000	July 1887 .05
46	Empire Lt., G., Mont	500,000	100,000	5	*	....	....	70,500	Oct. 1887 .37½
47	Eureka Con., G. & S. L., Nev.	5,000,000	50,000	100	550,000	Jun. 1889	.50	4,955,000	July 1888 .25
48	Evening Star, S. L., Colo.	500,000	50,000	10	*	....	....	1,45 .00.	Dec. 1889 .25
49	Excelsior, G., Cal.	10,000,000	100,000	100	560,000	Sept 1885	1.00	875,000	Oct. 1880 .25
50	Fisher de Smet, G., Dak.	10,000,000	100,000	100	200,000	Nov 1878	1.00	1,125,000	Aug 1885 .20
51	Franklin, C., Mich	1,000,000	40,000	25	220,000	Jun. 1871	.....	930,000	Jan. 1889 2.00
52	Freeland, G. & C., Colo.	5,000,000	200,000	25	*	....	....	190,000	July 1886 .10
53	Garfield Lt., G. & S., Nev.	500,000	100,000	5	.....	....	....	95,000	Apl. 1888 .12½
54	Gould & Curry, G. & S., Nev.	10,800,000	108,000	100	4,466,500	Apl. 1890	.30	826,800	Oct. 1870 10.00
55	Grand Prize, S., Nev.	10,000,000	100,000	100	715,000	Nov. 1889	.30	525,000	Jan 1890 .30
56	Granite, S., Idah.	500,000	50,000	10	*	....	....	28 4 .00	Oct. 1889 .02
57	Granite Mountain, S., Mont	10,000,000	400,000	25	.....	....	....	8,400,000	Mar. 1890 .50
58	Green Mountain, G., Cal.	1,250,000	125,000	10	*	....	....	212,000	Nov. 1881 .07½
59	Hale & Norcross, G. & S., Nev.	11,200,000	112,000	100	5,086,000	July 1887	.50	1,162,000	July 1888 .50
60	Hecla Con., S. & L. C., Mont	1,500,000	30,000	50	.....	....	....	1,500,000	Apl 1889 .50
61	Hel'a Mg & Red, G. & L., Mont	3,315,000	663,000	5	*	....	....	197,97	July 1886 .06
62	Holmes, S., Nev.	10,000,000	100,000	100	325,000	Mar. 1890	.25	75,000	Apl 1886 .25
63	Holyoke, G., Idah.	.....	200,000	200,000	1	.....	....	27 000	Feb 1883 .10
64	Homestake, G., Dak.	12,500,000	125,000	100	900,000	July 1878	1.00	4,543,750	May 1890 .10
65	Honorine, S. L., Utah	500,000	250,000	2	37,500	Apl. 1889	.05	125.000	Sept 1887 .05
66	Hope, S., Mont	1,000,000	100,000	10	*	....	....	233,252	Apl. 1888 .25
67	Horn-Silver, S. L., Utah	10,000,000	400,000	25	*	....	....	4,100,000	May 1890 .12½
68	Hubert, G., Cal.	1,000,000	1 100,000	...	*	....	....	247.00.	Dec. 1889 .00¾
69	Idaho, G., Cal.	310,000	3,100	100	.....	....	....	5,255,0	Dec. 1889 5.00
70	Ideal, S. L., Colo.	1,500,000	50,000	10	*	....	....	15,000	Oct. 1886 .05
71	Illinois, S., N. M.	100,000	100,000	1	*	....	....	45,000	Apl 1889 .20
72	Independence, S., Nev.	10,000,000	100,000	100	340.000	Oct. 1886	.20	225,000	Sept 1879 .25
73	Iron Hill, S., Dak.	2,500,000	250,000	10	134,000	July 1889	.03	156,250	Nov 1887 .07½
74	Iron-Silver, S. L., Colo.	10,000,000	500,000	20	*	....	....	2,500,000	Apl. 1889 .20
75	Jackson, G. & S., Nev.	5,000,000	50,000	100	237,500	Nov 1880	.20	55,000	Jun 1889 .10
76	Jay Gould, ..., Mont	2,000,000	40,000	5	*	....	....	395,000	Apl. 1889 .04
77	Jocuistita, ..., Mex.	2,500,000	250,000	10	.....	....	....	1,200,000	Feb. 1885 .50
78	Jumbo, G., Colo.	2,000,000	200,000	10	.....	....	....	35.000	Oct. 1887 .02½
79	Kearsarge, C., Mich	1,250,000	50,000	25	190,000	Oct. 1887	1.00	100,000	Jan 1890 2.00
80	Kentuck, ..., Nev.	3,000,000	30,000	100	369,000	Dec. 1889	.30	1,350,000	Dec. 1885 .10
81	La Plata, S. L., Colo.	2,000,000	200,000	10	*	....	....	610,000	Sept 1882 .30
82	Leadville Cons., S. L., Colo.	4,000,000	400,000	10	*	....	....	423,000	Apl. 1889 .05
83	Lexington, G. S., Mont	4,000,000	40,000	100	*	....	....	609,000	Jan. 1885 2.00
84	Little Chief, S. L., Colo.	10,000,00	200,000	50	*	....	....	810,000	Jan. 1890 .05
85	Little Pittsburg, S. L., Colo.	20,000,000	200,000	100	*	....	....	1,050,000	Mch. 1889 .50
86	Martin White, S., Nev.	10,000,000	100,000	100	100,000	Feb. 1890	.25	140.000	Dec. 1886 .25
87	Mary Murphy, G. & S., Colo.	350,000	35,000	10	*	....	....	175,000	May 1888 5.00
88	Matchless, S., Colo.	500.000	500,000	1	*	....	....	15,000	Feb. 1890 .00½
89	Minnesota, C., Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00	1,826,000	Mar. 1876 ....
90	Mono, G., Cal.	5,000,000	50,000	100	102,850	Nov. 1889	.25	12,500	Mar. 1886 .25
91	Montana, Lt., G. & S., Mont	3,300,000	360,000	5	*	....	....	2,465,129	Apl. 1890 .06
92	Morning Star, G., Colo.	1,000,000	100,000	10	.....	....	....	850,000	Dec. 1889 .20
93	Moulton, S. & L., Mont	2,000,000	400,000	5	*	....	....	320,000	Dec. 1887 .07½
94	Mount Pleasant, G., Cal.	150,000	150,000	1	*	....	....	150,000	Feb. 1887 .30
95	Mt. Diablo, S., Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00	160,000	Oct 1889 .20
96	Napa, Q., Cal.	700,000	100,000	7	.....	....	....	360,000	Apl. 1890 .10
97	Navajo, G. & S., Nev.	10,000,000	100,000	100	485,000	Apl. 1888	.30	365,000	Apl. 1889 .10
98	New Guston, S., Colo.	500,000	100,000	5	*	....	....	287,500	Dec 1889 .87½
99	N. Hoover Hill, G. & S., N. C.	300,000	120,000	2½	*	....	....	30,000	Dec. 1885 .00½
100	Northern Belle, S., Nev.	5,000,000	50,000	100	425,000	Jan. 1884	8.00	2,400,000	Apl. 1883 .50
101	North Belle Isle, S., Nev.	10,000,000	100,000	100	400,000	Sept 1889	.20	230,000	May 1888 .50
102	North Star, G., Cal.	1,000,000	100,000	10	.....	....	....	250.000	Dec. 1889 .50
103	Ontario, S. L., Utah	15,000,000	150,000	100	.....	....	....	11,000,000	May 1890 .60
104	Ophir, G. & S., Nev.	10,000,000	100,000	100	4,159,440	May 1889	.50	1,845,800	July 1882 1.00
105	Origina, G. & S., Colo.	1,500,000	60,000	25	*	....	....	123,000	Apl. 1888 .05
106	Osceola, C., Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60	1,322,500	Jun. 1890 1 00
107	Oxford, G., N. S.	125,000	125,000	1	*	....	....	73,500	Sept 1888 .02
108	Paradise Valley, G. & S., Nev.	10,000,000	100,000	100	57,000	Apl. 1888	.15	150.000	Apl 1887 .10
109	Parrot, C., Mont	1,800,000	180,000	10	*	....	....	5.2,000	Mar. 1890 .10
110	Peacock, S., N. M.	2,000,000	200,000	10	*	....	....	60,000	Nov. 1886 ....
111	Plumas Eureka, G., Cal.	1,000,000	100,000	10	*	....	....	2,548,000	Oct. 1889 .37½
112	Plutus, G. S. C. L., Colo.	2,000,000	200,000	10	*	....	....	20,000	Feb. 1886 .40
113	Plymouth Con., G., Cal.	5,000,000	100,000	50	*	....	....	2.280.000	Feb. 1883 .40
114	Quicksilver, pref., Q., Cal.	4,300,000	43,000	100	.....	....	....	1,641,422	May 1890 1.50
115	" com., Q., Cal.	5,700,000	57,000	100	.....	....	....	643,867	June 1882 .40
116	Quincy, C., Mich	1,000,000	40,000	25	200,000	Dec. 1862	....	5,370,000	Jan 1890 3.00
117	Republic, G., Mich.	5,000,000	200,000	25	400,000	Dec. 1889	.30	4,312,500	Jun 1887 1.25
118	Richmond, S. L., Nev.	1,350,000	54,000	25	*	....	....	99,785	Feb. 1880 .50
119	Ridge, C., Mich.	500,000	20,000	25	219,939	Mar 1886	.50	585,000	Mar. 1886 .05
120	Robinson Con., S. L., Colo.	10,000,000	200,000	50	*	....	....	100,000	Dec. 1882 .50
121	Robert E. Lee, S. L., Colo.	10,000,000	500,000	20	.....	....	....	4,460,000	July 1869 3.00
122	Savage, S., Nev.	11,200,000	112,000	100	6,542,000	July 1889	.50	7,500	Apl. 1883 .01
123	Shoshone, S., Idah.	150,000	150,000	1	.....	....	....	1,598,140	Apl. 1888 .12½
124	Sierra Buttes, G., Cal.	2,225 000	122,500	10	.....	....	....	102.000	Jan. 1871 1.00
125	Sierra Nevada, G. & S., Nev.	10,000,000	100,000	100	6,250,000	Oct. 1889	.50	270,000	Apl. 1889 .10
126	Sierra Nevada, S. L., Idaho	1,000,000	1	1	*	....	....	40,000	May 1889 .02
127	Silver Cord, G. & S. L., Colo.	4,500,000	450,000	10	.....	....	....	270,000	Apl 1889 .10
128	Silver King, S., Ariz.	10,000,000	100,000	100	80,000	Jan. 1890	.30	1,950,000	July 1887 .25
129	Silver Mg. of Mex., Mex.	500,000	50,000	10	.....	....	....	150,000	Apl. 1890 .05
130	Silverton, G. & L., Colo.	2,000,000	200,000	10	*	....	....	50,000	Jan. 1881 .25
131	Small Hopes Cons., S., Colo.	5,000,000	250,000	20	*	....	....	3,137,500	Jun. 1889 .10
132	Spring Valley, G., Cal.	200,000	200,000	1	50,000	Oct. 1886	.25	3,595,000	Jun. 1888 .05
133	Standard, G. & S., Cal.	10 000,000	100,000	100	50,000	Feb. 1890	.25	155,000	Nov. 1881 .06
134	Stormont, S., Utah	500,000	500,000	1	*	....	....	844,00	Dec. 1887 .20
135	St. Joseph, L., Mo.	1,800,000	180,000	10	*	....	....	9,00	Apl. 1889 .02½
136	Swansea, G., Colo.	600,000	60,000	10	*	....	....	100,000	Nov 1881 .20
137	Tamarack, C., Mich.	1,000,000	40,000	25	520,000	Apl. 1885	3.00	1,44),000	Apl. 1882 .10
138	Tip Top, S., Ariz.	10,000,000	100,000	100	250,000	Sept 1883	.25	1,250,000	Apl. 1890 3.00
139	Tombstone, G. & L., Ariz.	10,000,000	500,000	20	*	....	....	97,500	Feb. 1884 .20
140	United Verde, C., Ariz.	3,000,000	300,000	10	*	....	....	37,500	Apl 1886 2.50½
141	Valencia, M., N. M.	150,000	1,500	100	.....	....	....	272,500	Oct. 1888 .37½
142	Viola Lt., S. L., Idah.	750,000	150,000	5	*	....	....	1,275,000	July 1887 .10
143	Ward Cons., S. L., Colo.	2,000,000	200,000	10	.....	....	....	20,000	Dec. 1889 .05
144	Yankee Girl, ..., Colo.	2,500,000	250,000	10	.....	....	....	2,184,000	Aug 1871 1.50
145	Yellow Jacket, G. & S., Nev.	12,000,000	120,000	100	5,508,000	Mar 1889	.50	3,300	Jun 1889 .10
146	Webb City, L. Z., Mo.	55,000	11,000	5	.....	....	....	25,000	Oct. 1889 .10
147	Woodside, ..., Utah	.....	.....	...	.....	....	....	175,000	.... 1889 .25
148	Young America, ..., Cal.	.....	.....	...	.....	....	....	.....	.... 1889 .10

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied.	Assessments. Date & am't of last.
1	Agassis Cons., S. L., Colo.	$2,500,000	50,000	$50	*	....
2	Alleghany, S., Colo.	5,000,000	500,000	10	.....	....
3	Alloues, C., Mich	2,000,000	80,000	25	$737,000	Jan. 1890 50
4	Alpha Con., G. & S., Nev.	3,000,000	30,000	100	588,750	July 1888 87½
5	Alta, S., Nev.	10,080,000	100,800	100	2,248,800	Sept 1888 50
6	Amador, G., Cal.	400,000	200,000	2	.....	....
7	American Flag, S., Colo.	1,250,000	125,000	10	300,000	Jun 1877 .10
8	Amity, S., Colo.	250,000	250,000	1	.....	....
9	Anglo-Montana, Lt., Mon.	600,000	120,000	5	.....	....
10	Astoria, G., Cal.	200,000	100,000	2	.....	....
11	Barcelona, G., Nev.	5,000,000	200,000	25	.....	....
12	Bechtel Con., G., Cal.	10,000,000	100,000	100	173,500	Jan. 1883 .10
13	Belmont, S., Nev.	5,000,000	100,000	100	735,000	Apl. 1886 .10
14	Best & Belcher, G. & S., Nev.	10,080,000	100,800	100	2,180,500	Jan. 1890 .25
15	Big Pittsburg, S. L., Colo.	20,000,000	200,000	100	*	....
16	Bi-Metallic, S., Mon.	5,000,000	200,000	25	*	....
17	Black Oak, G., Cal.	3,000,000	300,000	10	*	....
18	Boston Con., G., Cal.	10,000,000	100,000	100	170,000	Nov 1883 .25
19	Bremen, S., N. M.	5,000,000	500,000	10	*	....
20	Brownlow, S., Colo.	250,000	250,000	1	*	....
21	Brunswick, G., Cal.	2,000 000	400,000	5	.....	....
22	Bullion, G. & S., Nev.	10,000,000	100,000	100	4,007,000	Aug. 1888 .50
23	Calaveras, G., Cal.	500,000	500,000	1	*	....
24	Carisa, G., Wy.	500,000	100,000	5	*	....
25	Carupano, G. & L. C., Ven.	200,000	200,000	2	*	....
26	Cashier, G. & S., Colo.	500,000	250,000	2	*	....
27	Charles Dickens, G. & S., Idah.	1,250,000	250,000	5	*	....
28	Cherokee, G., Cal.	1,500,000	150,000	10	.....	....
29	Chollar, S., Nev.	11,200,000	112,000	100	1,484,000	July 1889 .50
30	Cleveland, T., Dak.	1,000,000	500,000	2	*	....
31	Colchis, ..., N. M.	500,000	50,000	10	.....	....
32	Commodore, G., Nev.	10,000,000	100,000	100	170,000	Nov 1888 .50
33	Comstock, G. & S., Nev.	10,000,000	100,000	100	30 000	Mar. 1887 .15
34	Con. Imperial, G. & S., Nev.	5,000,000	50,000	100	1,802,500	Nov. 1889 .05
35	Con. Pacific, G., Cal.	6,000 000	60,000	100	192,000	Oct. 1889 .10
36	Cons. Silver, S., Mo.	2,500,000	250,000	10	.....	....
37	Crescent, S. L., Colo.	3,000,000	300,000	10	*	....
38	Crocker, S., Ariz.	10,000,000	100,000	100	135,000	Jan. 1890 .10
39	Crowell, G., N. C.	500,000	500,000	1	.....	....
40	Dahlonega, G., Ga.	250,000	250,000	1	.....	....
41	Dandy, S., Colo.	5,000,000	500,000	10	.....	....
42	Decatur, S., Colo.	1,500,000	300,000	5	*	....
43	Denver City, S. L., Colo.	5,000,000	500,000	10	*	....
44	Denver Gold, G., Colo.	100,000	60,000	5	*	....
45	Durango, G., Colo.	500,000	500,000	1	.....	....
46	Eastern Dev. Co., Lt., N. S.	1,500,000	150 000	10	990,000	Mar. 1888 1.00
47	El Cristo, G. & S., U.S.C	1,000,000	500,000	2	*	....
48	El Dorado, G., Cal.	1,000,000	250,000	4	*	....
49	El Talento, G., U.S.C	1,000,000	500,000	2	*	....
50	Emplyre, C., Utah	10,000,000	100,000	100	*	....
51	Eureka Tunnel, S. L., Nev.	10,000,000	100,000	100	*	....
52	Exchequer, ..., Nev.	10,000,000	100,000	100	815,000	Apl. 1889 .25
53	Found Treasure, G. & S., Nev.	10,000,000	100,000	100	30,500	Apl. 1889 2½
54	Gogebic L. Syn., I., Wis.	5,800,000	200,000	25	.....	....
55	Gold Cup, S., Colo.	500,000	500,000	1	*	....
56	Gold Era, G., Colo.	2,000,000	200,000	10	*	....
57	Gold Placer, G., Colo.	5,000,000	200,000	25	229,314	Dec. 1885 .25
58	Gold Rock, G., Cal.	1,000,000	500,000	2	*	....
59	Goodshaw, G., Cal.	10,000,000	100,000	100	*	....
60	Grand Belt, C., Tex.	12,000,000	120,000	100	.....	....
61	Grand Duke, ..., Colo.	800,000	80,000	10	.....	....
62	Great Republic, G., U.S.C	1,000,000	500,000	2	*	....
63	Gregory-Bobtail, G., Colo.	550,000	550,000	1	*	....
64	Gregory Con., G., Mon.	3,000,000	300,000	10	.....	....
65	Harlem M. & M. Co., G., Mon.	1 000,000	200,000	5	.....	....
66	Head Cent. & Tr. S., G., Ariz.	10,000,000	100,000	100	.....	....
67	Hector, G., Cal.	1,500,000	300,000	5	45,000	Jan. 1889 .15
68	Highland, C., Mich	500,000	25,000	20	.....	....
69	Hollywood, ..., Cal.	200,000	100,000	2	.....	....
70	Hortense, S., Colo.	2,000,000	200,000	10	.....	....
71	Huron, C., Mich	1,000,000	40,000	25	280,000	May 1887 3.70
72	Iron Gold & Silver, S., N. M.	2,000,000	200,000	10	*	....
73	Ironton, I., Wis.	1,000,000	40,000	25	.....	....
74	Iroquois, S., Mich.	1,250,000	50,000	25	.....	....
75	J. D. Reymert, ..., Ariz.	10,000,000	100,000	100	.....	....
76	Julia Cons., G. & S., Nev.	11,000,000	110,000	100	1,660,000	Jan. 1889 .10
77	Lacrosse, G., Colo.	1,000,000	100,000	10	*	....
78	Lee Basin, S. L., Colo.	5,000,000	500,000	10	*	....
79	May flower Gravel, ..., Cal.	1,000,000	100,000	10	585,000	Mar. 1890 .50
80	Mesa Mesapa, S., Colo.	500,000	500,000	1	*	....
81	Medora, G., Dak.	250,000	250,000	1	.....	....
82	Mexican, G. & S., Nev.	10,000,000	100,000	100	2,800,760	Dec. 1889 .25
83	Middle Bar, G., Cal.	400,000	200,000	2	*	....
84	Mike & Starr, S. L., Colo.	1,000,000	200,000	5	*	....
85	Mollie Gibson, ..., Colo.	2,000,000	100,000	2	.....	....
86	Monitor, G., Cal.	1,000,000	100,000	1	*	....
87	Mutual Mg. & Sm., W'sh	10 0 000	1,100,000	1	*	....
88	Native, C., Mich	1,000,000	40,000	25	.....	....
89	Neath, G., Colo.	1,000,000	100,000	10	.....	....
90	Nevada Queen, S., Nev	10,000,000	100,000	100	250,000	Oct. 1889 .25
91	New Germany, G., N. S.	100,000	100,000	1	*	....
92	New Pittsburg, S. L., Colo.	4,000,000	200,000	10	*	....
93	N. Commonw'th, S., Nev.	10,000,000	100,000	100	60,000	Apl 1889 ....
94	North Standard, G., Cal.	10,000,000	100,000	100	20,000	Nov ....
95	Noonday, ..., Cal.	600,000	60,000	10	208,000	Dec 1881 .10
96	Oneida Chief, G., Cal.	500,000	125,000	100	*	....
97	Oriental & Miller, S., Nev.	10,000,000	400,000	25	.....	....
98	Osceola, S., Nev.	5,000,000	500,000	10	.....	....
99	Overman, S., Nev.	11,520,000	115,200	100	3,823,400	Dec. 1889 ....
100	Park, S., Utah	2,000,000	200,000	10	.....	....
101	Peer, S., Ariz.	10,000,000	100,000	100	155,000	Sept 1889 .10
102	Peerless, S., Ariz.	10,000,000	100,000	100	370.000	Mar. 1889 .25
103	Phoenix, ..., Ariz.	500,000	500,000	1	*	....
104	Phoenix, G., Colo.	6,000,000	200,000	25	*	....
105	Phoenix Lead, G. & L., Colo.	100,000	100,000	1	*	....
106	Pilgrim, G., Cal.	600,000	300,000	2	*	....
107	Potosi, S., Nev.	11,200,000	112,000	100	1,461,600	Sept 1889 .50
108	Proustite, S., Idah.	250,000	250,000	1	*	....
109	Puritan, G., Colo.	1,500,000	150,000	10	*	....
110	Quincy, ..., Colo.	3,000,000	300,000	10	.....	....
111	Rappahannock, G. & S., Va.	250,000	250,000	1	*	....
112	Red Elephant, S., Colo.	500,000	500,000	1	*	....
113	Ropes, G. & S., Mich	2,000,000	80,000	25

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	May 17. H.	May 17. L.	May 19 H.	May 19 L.	May 20. H.	May 20. L.	May 21 H.	May 21 L.	May 22 H.	May 22 L.	May 23 H.	May 23 L.	SALES.
Adams, Colo.	....	....	....	....	....	....	....	....	.95	....	....	....	1,000
Alice, Mont.	2.35	....	2 40	2.35	2 50	2.40	2.50	2.35	....	....	....	....	2,000
Argenta, Nev.	.15	....	....	....	....	....	....	....	....	.16	....	....	700
Asp n Mg , Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Belcher	....	....	....	....	....	....	....	....	....	....	....	....	....
Belle Isle, Nev.	....	....	.50	.49	....	....	....	....	.50	....	.50	....	200
Bodie Cons., Cal.	....	....	....	....	....	....	....	....	.70	.6	....	....	500
Bos. & Mont., Mont.	....	....	....	....	....	....	....	....	....	....	....	....	....
Breece, Colo.	....	....	....	....	....	....	.45	....	....	....	....	....	50
Bulwer, Cal	....	....	....	....	....	....	20	.....	....	....	....	....	150
Caledonia	....	....	....	....	2 25	....	2 25	....	....	....	....	....	2 0
Cr alpa, Colo	....	....	.40	....	.50	....	....	....	.52	....	....	....	1,200
Colorado Central	....	....	....	....	1 10	....	....	....	....	....	....	....	1 0
Confidence, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Cons. Cal. & Va., Nev.	4.30	....	....	....	4.50	....	....	....	4 75	....	....	....	300
Crown Point, Nev.	1 90	....	....	....	2.20	....	....	....	....	....	....	....	200
Deadwood, Dak.	....	....	....	....	....	....	....	....	1 35	....	....	....	200
Dunkin, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Eureka Con.	....	....	....	....	....	....	....	....	....	....	....	....	....
Father de Smet, Dak	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	....
Freeland, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Gould & Curry, Nev.	....	....	....	....	1.40	....	....	....	1.55	....	1.60	....	300
Hale & Norcross, Nev	2.40	....	....	....	....	....	2.60	....	....	....	....	....	200
Holyoke, Id.	....	....	....	....	....	....	....	....	....	....	....	....	....
Homestake, Dak.	....	....	....	....	10.00	....	....	....	....	....	....	....	300
Horn-Silver, Ut.	3.35	3 15	3 20	3.15	3.25	3.20	3 25	....	3.30	3 25	3.30	3 20	3,450
Iron Silver, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Leadville Co., Colo.	....	....	10	....	....	....	....	....	.13	....	.12	....	1,900
Little Chief, Colo.	.31	....	....	....	.31	....	.32	.31	.31	.30	....	....	3,200
Little Pittsburg, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Mono, Cal	.45	....	.41	.40	....	....	....	....	....	.45	....	....	800
Moulton	....	....	....	....	....	....	....	....	....	.55	....	....	500
Navajo, Nev.	.50	....	....	....	....	....	....	....	....	....	....	....	300
North Belle Isle, Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
North Star, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....
Ontario, Ut.	....	....	....	....	....	....	....	....	....	....	45.25	45 00	750
Ophir, Nev.	3 80	....	....	....	....	....	....	4 15	....	....	....	....	300
Osceola, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	....
Plymouth, Cal.	9.50	8.50	....	....	8.25	....	8.00	7.50	8.00	7 38	8.00	7 88	1,130
Quicksilver, Pref.	....	....	....	....	....	....	....	....	....	....	39 50	39.00	470
Quicksilver, Com.	....	....	....	....	....	....	....	....	....	....	....	....	....
Quincy, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	....
Robinson Cons. Colo.	....	....	....	....	....	....	....	....	.50	.45	.50	....	2,535
Savage, Nev.	....	....	....	....	1.65	....	....	....	....	....	....	....	100
Sierra Nevada, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver Cord.	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver King	....	....	.50	....	.55	....	....	....	....	.50	....	....	600
Silver Hill of L. V.	....	....	....	....	....	....	....	....	....	....	....	....	....
Standard	....	....	....	....	....	....	.3	.30	.30	....	.30	....	1,100
Stormont, Utah	....	....	....	....	....	....	....	....	....	....	....	....	....
Ward Con.	....	....	....	....	....	....	....	....	....	....	....	....	....
Yellow Jacket Nev	2 15	....	....	....	2.65	....	....	....	....	....	....	....	2 0

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	May 17. H.	May 17. L.	May 19. H.	May 19. L.	May 20 H.	May 20 L.	May 21. H.	May 21. L.	May 22 H.	May 22 L.	May 23. H.	May 23. L.	SALES.
Allouez	....	....	....	....	....	....	....	....	....	....	....	....	....
Alta, Nev.	1.15	....	....	....	1.30	....	1.30	....	1.30	....	....	....	700
Andes, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Amador, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....
American Flag, Colo	.08	....	....	....	....	....	....	....	....	....	....	....	....
Astoria, Cal.	.04	....	.04	....	.04	....	.04	....	....	....	.10	....	2,400
Barcelona, Nev.	....	....	....	....	....	....	....	....	....	....	.06	.05	5,200
Best & Belcher, Nev.	....	....	....	....	2.70	....	....	....	....	....	....	....	....
Bonanza King, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	300
Brunswick, Cal.	2 00	....	2.00	....	2 05	2.00	2.00	....	2.00	....	.20	....	100
Bullion, Nev.	....	....	....	....	....	....	....	....	....	....	2.10	2 05	5,400
Butte & Bost., Mont.	....	....	....	....	....	....	....	....	....	....	....	....	....
Castle Creek, Id.	....	....	....	....	....	....	....	....	....	....	....	....	....
Challar, Nev.	2 50	....	....	....	....	....	....	....	....	....	....	....	....
Col & Beaver, Id.	....	....	....	....	....	....	....	....	....	....	.04	....	100
Commonwealth, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Comstock T., Nev.	.17	....	.18	.17	....	....	.17	....	.17	....	.17	....	5,300
" bonds.	....	....	....	....	....	....	....	....	....	....	....	....	....
" scrip	....	....	....	....	....	....	....	....	....	....	....	....	....
Con. Imperial, Nev.	....	....	....	....	....	....	....	....	....	....	.80	....	400
Denver City, Colo.	....	....	....	....	....	....	....	....	....	....	11	....	1,000
El Cristo, Rep of Cu.	1.20	....	1 20	....	1.15	....	1.25	....	1.25	....	....	....	600
Excelsior, Cal	....	....	....	....	....	....	....	....	....	....	....	....	....
Gold Sep. Cal.	.02	....	....	....	....	....	....	....	....	....	....	....	....
Julia, Nev.	....	....	.40	....	.40	....	.40	....	....	....	.40	....	400
Kings'n & Pemb'ke	....	....	....	....	....	....	....	....	....	....	....	....	1,000
Kossuth, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Lacrosse, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Lee Basin, Colo	....	....	....	....	....	....	....	....	....	....	....	....	....
Mexican, Nev	2.70	....	....	....	2 90	....	....	....	....	....	3 30	....	300
Minn Iron Co., Mich	....	....	85.00	....	....	....	....	....	....	....	....	....	31
Moniter	....	....	....	....	....	....	....	....	....	....	....	....	....
Mutual Sm. & M. Co	....	....	1.60	....	1 55	....	1.60	....	1.60	....	1.55	....	950
Nevada Queen, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
N. Com'nw'th, Nev.	....	....	....	....	2.00	....	....	....	....	....	....	....	200
Occidental, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Oriental & Mil., Nev	....	....	....	....	....	....	....	....	....	....	....	....	....
Overman, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Phoenix of Ariz.	1.30	1.15	1 35	1.30	1 40	1.25	1 40	1 10	1.10	1 30	1.50	1.40	1,265
Potosi, Nev.	....	....	....	....	....	....	....	....	....	....	3.50	....	40
Rappahann'k, Va	....	....	.05	....	.06	....	.06	....	....	....	....	.06	2,000
S. Sebastian, San S	....	....	....	....	....	....	....	....	....	....	....	....	....
Scorpion, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Sep. Belcher, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Shoshone	....	....	....	....	....	....	....	....	....	....	.12	....	1,100
Silver Queen	....	....	....	....	....	....	....	....	....	....	.15	....	500
Sutro Tunnel, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
" Trust Cert.	....	....	....	....	....	....	....	....	....	....	....	....	....
Sutter Creek, Cal.	1.60	....	1.55	....	1.6	....	1 50	....	1 50	....	1.5	....	2,235
Tornado, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Union Cons., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Utah, Nev.	.85	....	....	....	.85	....	....	....	....	....	....	....	1,100
Wall St M. & M. Co	....	....	....	....	....	....	.95	....	....	....	....	....	....

*Ex dividend, †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment unpaid. Dividend shares sold, 15,435. Non-dividend shares sold, 73,601. Total, New York, 98,286.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	May 16	May 17.	May 19	May 20.	May 21.	May 22	SALES.
Atlantic, Mich.	20.50	20.25	21.00	21.00	20 88	21 00	21 25	20.50	21 .3	20.28	2,198
Bodie, Cal.	....	....	....	....	....	....	....	....	....	....	....
Bonanza Developm't	....	....	....	....	.99	.83	.99	....	.93	.88	3,6 0
Bost. & Mont., Mont.	53.50	53.00	53.50	53.00	55 50	53 25	57 00	55.50	59 00	56 88	59.75	57.00	12,445
Breece, Colo.	47	....	....	....	48	....	48	....	48	....	....	....	900
Calumet & Hecla, Mich.	304	300½	301	300	303	302	309	304	3 9	308	309	....	568
Catalpa, Colo.	.30	....	.30	.25	.29	....	43	.35	.6	.30	15	....	18,500
Central, Mich.	....	....	16,00	....	....	....	....	....	....	....	15 00	....	105
Chrysolite, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Con. Cal. & Va., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Dunkin, Colo.	....	....	....	....	....	....	.73	....	.70	....	7.0	....	600
Eureka, Nev.	....	....	....	....	4 50	....	....	....	....	....	....	....	0
Franklin, Mich.	18 75	18.25	18.50	18.0	18.25	17.75	18 00	17 75	18 75	17.75	18 75	18.10	2,998
Freeland, Col.	....	....	....	....	....	....	....	....	....	....	....	....	....
Kearsarge.	....	....	....	....	....	....	....	....	....	....	....	....	....
Little Chief, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Little Pittsburg, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Martin White, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Moulton.	....	....	....	....	....	....	....	....	....	....	....	....	....
Napa, Cal.	....	....	....	....	5.50	....	....	....	....	....	....	....	450
Ontario, Utah	....	....	....	....	....	....	....	....	....	....	....	....	....
Osceola, Mich.	37 25	37.00	37.75	37.50	38.00	37.7	38.00	37.50	38 63	37.63	39 00	38.25	2,850
Pewabic, Mich.	8.00	....	....	....	....	....	....	....	....	....	....	....	55
Quincy, Mich.	97.00	96.00	97.00	....	....	....	97.00	96.00	97.00	....	98 ½	99.00	167
Badge, Mich.	....	....	....	....	1.00	....	....	....	1.00	....	....	....	450
Sierra Nev., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Silver King, Ariz.	....	....	....	....	....	....	....	....	....	....	....	....	....
Standard, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	....
Tamarack, Mich.	184	....	185	....	186	185	193½	183	193	191½	191	....	319

NAME OF COMPANY	May 16.		May 17.		May 19.		May 20		May 21.		May 22		SALES.
Allouez, Mich.	6.50	6.75	6 50	6 00	6 63	6.25	6 50	6 38	6 63	6 2-	6 0	6 25	9,270
Arnold, Mich.	88	.85	.95	.88	....	....	.95	.85	.95	.88	.90	....	4,000
Atec, Mich.	.08	....	....	....	.10	....	.11	....	....	....	....	....	750
Bowman S., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	....
Butte & Bost., Mont.	23.00	21 75	22.00	....	22 75	22 00	23 50	22 75	24.88	23 00	25 50	23 50	8,757
Centennial, Mich	38.25	36 50	38.00	37.50	38 00	36 00	36 00	34 00	34 50	34 00	34.50	33 00	7,147
Claudia J., Colo.	....	....	....	....	10	....	....	....	....	....	....	....	100
Copper Falls Mg.	....	....	....	....	....	....	6.50	5.00	9.00	8.5	9 50	....	80
Crescent, Colo.	....	....	....	....	13	....	.18	12	.20	.15	.18	.10	7,100
Don Enrique, N. M.	.15	....	....	....	....	....	.15	....	.15	....	....	....	400
El Cristo, S. A.	....	....	....	....	....	....	....	....	....	....	....	....	....
Hanover, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	....
Humboldt, Mich.	14	....	....	....	.40	....	....	....	.25	....	....	....	50
Hungarian, Mich	....	....	....	....	....	....	....	....	....	....	....	....	....
Huron, Mich.	4 50	4 00	4 00	....	4 25	4 00	4 13	4 00	4.2	4 00	4 13	4.00	7 635
Kearsarge.	22 75	21.00	2.50	22.00	23 00	22 50	24 75	23 00	25 00	23. 0	25.00	24.00	10,624
Meanard, Mich.	65	....	....	....	63	....	60	....	....	....	....	....	250
National, Mich.	2.00	....	....	....	2.00	....	2 13	2.00	2.00	....	2.00	....	1,150
Native, Mich.	.08	....	....	....	....	....	.09	....	....	....	....	....	1,000
Oriental & M., Nev.	....	....	....	....	....	....	....	....	.07	....	....	....	500
Phoenix.	....	....	....	....	1 30	....	....	....	1 35	....	....	....	1,300
Rappahannock, Va.	....	....	....	....	....	....	....	....	....	....	....	....	....
Rockland.	....	....	....	....	....	....	....	....	....	....	....	....	....
Santa Fe, N. Mex.	.70	.60	.70	.65	.70	.65	.70	.65	.70	.65	.75	.70	20,000
Security, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	....
Shoshone, Idaho.	....	....	....	....	....	....	....	....	....	....	....	....	....
South Side, Mich.	.25	....	....	....	.25	....	.35	....	....	....	....	....	300
Star.	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington, Mich	.35	....	....	....	....	....	....	....	....	....	....	....	100

Boston: Dividend shares sold, 45,670. Non-dividend shares sold, 92,183. Total Boston, 137,853.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	May 17. H.	May 17. L.	May 19. H.	May 19. L.	May 20. H.	May 20. L.	May 21. H.	May 21. L.	May 23. H.	May 23. L.	May 23. H.	May 23. L.	Sales
American Coal.		....	....	....	....	....	....	....	....	....	....	....	....	....
Cambria Iron.		....	....	....	....	....	....	....	....	....	....	....	....	....
Cameron Coal & Iron Co		....	....	....	....	....	....	....	....	....	....	....	....	....
Ches. & O. RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Chic. & Ind. Coal RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Col. & Hocking Coal.	100	30¼	29¾	32	30¾	31¾	31¼	31¾	31¼	31	30	30½	29¾	9,490
Col., C. & I.	100	51½	....	54	51¼	53½	53	52¾	51¾	52½	51¼	53½	52½	22,380
Consolidation Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Del. & H. C.	100	17.1¼	173	174¼	173	172½	171	172¼	172	171½	170	172	171¼	5,155
D., L. & W. RR.	50	148¾	148	148¾	147¾	147¾	146¾	147¼	146	147¾	146	147	146¾	65,907
Hocking Valley.	100	25¼	25¼	....	....	25½	25½	25	....	24¾	24¼	25¼	25	2,820
Hunt. & Broad Top		22¾	....	23¼	22½	22¾	....	22¾	22¼	22½	22	....	....	4,663
Do. pref		48½	....	49	48¾	48¾	48¼	48¾	48¼	48¾	48¼	....	....	2,113
Illinois Coal & Coke Co.		....	....	....	....	....	....	....	....	....	....	....	....	....
Lehigh C. & N.	50	53¾	53¾	57¾	53¾	53¾	53	53	52¾	54	53	....	....	5,705
Lehigh Valley RR.	50	54	53¾	54¼	53½	53¾	53	53¼	....	53	52½	....	....	3,317
Lehigh & Wilkesb. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Mahoning Coal	100	....	....	....	....	....	....	....	....	70¾	70	....	....	200
Marshall Con. Coal.		....	....	....	....	....	....	....	....	....	....	....	....	....
Maryland Cos.	100	....	....	....	....	....	....	....	....	14½	....	15	....	300
Morris & Essex.	100	....	....	155	....	....	....	....	....	....	....	....	....	100
New Central Coal.	50	....	....	10¾	....	....	....	11	....	....	....	....	....	200
N. J. C. R. R.	100	127½	126¾	....	....	127	126¾	126	124½	125	124	....	....	1,860
N. Y. & S. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	....
N. Y., Susq. & Western	100	....	....	....	....	8½	....	....	....	8¾	8¼	8¾	....	855
Do. pref.	100	....	....	34¼	33¾	33¾	....	31¼	31	34½	34¼	....	....	1,720
N. Y. & Perry C. & I.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Norfolk & Western R.R.	50	....	....	24	....	24¼	24¼	24¼	23¾	24	23¾	24¼	....	2 950
Do. pref.	50	....	....	66¾	66	66¾	65	65¾	65¼	66	65	66¼	....	3,231
Penn. Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	....
Penn. RR.	50	54¾	54⅜	54⅝	54⅛	54¾	54⅛	54¼	54¼	54⅜	54¼	....	....	3,672
*Ph. & R. RR.		47⅞	46¾	48¼	47⅛	48	47½	47¼	46¾	47	46¾	46¾	46¼	**315,804
Sunday Creek Coal.		....	....	....	....	....	....	....	....	....	....	....	....	....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	....
Tennessee C. & I. Co.		....	56¾	55	56¾	55¾	55¼	53	55	52	53¼	53	53¼	53	7,070
Do. pref.		....	....	....	....	....	....	....	....	....	....	....	....	....	....
Westmoreland Coal.		....	....	....	....	....	....	....	72	....	....	....	....	....	72

**Sales in New York, 180,552; in Philadelphia, 126,252. Total sales, 306,794.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. May 16.	May 17	May 19	May 20	May 21.	May 22
Alpha	....	....	....	....	....	....
Alta	1.05	....	1.20	....	1.15	1.10
Belcher	....	....	....	....	....	....
Belle Isle	.40	.45	.45	.45	.45	....
Best & Bel.	....	2.50	2.55	2.75	2.80	2.90
Bodie	....	....	.50	.60	.70	....
Bulwer	....	....	....	....	.25	....
Challar	2 90	2.45	2.50	2.85	3.20	3.25
C'm'weal'h	4.10	....	4.00	3 95	4.00	....
Con. C. & V	4.10	4.10	4.35	4.50	4.60	3.60
Con. Pac.	....	....	....	....	....	....
Crown Pt.	1.80	1.80	2.10	2.20	2.20	2.15
Eureka C.	....	....	4.15	....	....	....
Gould & C.	....	1.30	1.25	1.40	1.50	1.50
Grd. Prize.	....	....	....	....	....	....
Hale & N.	2.25	2.25	2.40	2.50	2.50	2.65
M. White.	....	....	....	....	....	....
Mexican.	2.60	2.80	2 85	2.95	3.00	3.15
Mono.	....	....	....	....	.35	....
Mt. Diablo	....	....	....	....	....	....
Navajo	....	....	....	.45	.40	....
Nev. Queen	.65	....	.70	.65	....	.70
N. Belle I	1.30	....	....	....	1.30	1.30
Occidental.	....	....	....	....	....	....
Ophir.	3.70	3.85	3.80	3.90	4 00	4.20
Potosi.	2.80	2.85	2 90	3.75	4.30	4.35
Savage	1.50	....	1.45	....	1 80	1.85
Sierra Nev	1.35	1.00	1.70	1.75	1.75	1.80
Union Con.	2 10	2.15	2.25	2.40	2.65	2.60
Utah.	70	....	70	....	.80	.80
Yellow Jkt.	2 60	2.15	2.60	2.75	3.75	2.75

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	....	$1.25
Balt. & N. C	....	....
Big Vein Coal	....	....
Conrad Hill	....	.10
Cons. Coal	$.25@$.26	.27
Diamond Tunnel	.25	....
George's Crk. C	....	1 30
Lake Chrome	.10@.19	.25
Maryland & Charlotte	....	....
North State	.10	....
Silver Valley	.15@.20	.30

Prices bid and asked, lowest and highest, during the week ending May 21st.

Birmingham, Ala.

COMPANY.	Bid. L. H.	Asked. L. H.
Ala. R. Mill Co.	....	$60
*Alice Furnace	$103	....
Anna Howe G. Mg. Co	$⅞	$¾
Bessmer Land.	$36@$37¾	$37@$38½
Bir. Mg.& Mfg.	$85	$103@$105
Cahaba Coal Mg. Co	....	$70
Camille Gold Mg. Co	$½	....
De Bardeleben C. & I. Co	$77	$79
Decat. L. Imp.	$11¾@$12	$14
Decatur Min. L.	$22½	....
Ensley Land	$11¼	$12
*Eureka	**$100@$200	$300
Florence L. & Mg. Co	$21	$24@$25
Gadsen Land	$6½@$6¾	$6⅝@$6¾
Hecla Coal Co.	$30	....
Hen. S. & M.Co	$90@$99	$99@$105
Mag-Ellen	$100	....
Mary Lee C. & R. Co	$10@$20	$30
Sheffield C. & I. Co	$63	....
Sloss I. & S	....	$57
†Sloss I. & S	$93¼	$95
††Sloss I. & S.	....	$78
Tuscaloose C. I. & L. Co	$24	$26@$27
Tenn.C. & I. Co.	....	$55
" pref.	$104	$106
Woodstock I.Co.	$40@$40¼	$40½@$44

Prices, highest and lowest, bid and asked during week ending May 19th.
* Bonds. † First mortgage. †† Second mortgage. ** Without interest.

Pittsburg, Pa.

COMPANY.	B.	A.	Closing
Allegheny Gas Co	$38.00	....	$38.00
Bridgewater Gas Co	55.00	....	55.00
Chartiers Val. Gas	....	45.00	45.00
Columbia Oil Co	2.00	3.00	2.25
Consolidated Gas Co	....	....	....
East End E. Light Co.	60.00	60.00	60.00
East End Gas Co	....	....	....
Forest Oil	.90.00	....	90.00
Hazlewood Oil Co	....	....	....
La Noria Mining	.16	.25	.23
Luster Mg. Co	14.75	16.00	15.75
Manufacturers Gas Co.	....	20.00	20.00
Nat. Gas Co. of W. Va	60.00	....	60.00
N.Y.& Clev.Gas Coal.	30.50	33.00	33.00
Ohio Valley Gas	....	....	....
Mansfield C. & C. Co.	....	....	....
Pennsylvania Gas	14.00	16.00	14.00
People's Natural Gas.	20.00	35.00	34.50
People's N. G. & P. Co	15.38	16.00	15.50
Philadelphia Co	31.63	31.88	31.88
Pine Run Gas Co.	....	59.00	59.00
Pittsburg Gas	....	80.00	80.00
Silverton Mg. Co	....	....	....
South Side Gas	....	....	....
Tuna Oil Co	....	....	....
Union Gas	....	....	....
Washington Oil Co	84.00	90.00	90.00
W'house Brake Co	64.00	....	64.00
W'house A. B. Co	116.00	120.00	120.00
W'house E. Light	39.88	40.00	39.88
W'moreland & Camb.	....	20.00	20.00
Wheeling Gas	21.00	....	21.00
Yankee Girl Mg	....	....	....

* Actual selling price.

Prices bid, asked and closing during the week ending May 22.

St. Louis. May 21.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo	$ .85	$ .90
American & Nettie	1.95	2.00
Anderson	....	....
Aztec, N.Mex	.07	.15
Bi-Metallic	28.75	29.50
Black Oak, Cal	....	.01
Black Spar	....	....
Bremen	....	....
Buckskin	.05½	.06
Carriboo, Idaho	....	....
Central Silver	.17½	.18¾
Cleveland, Colo	.01½	.02½
Cleveland, Idaho	.20	.25
Cœur d'Alene	....	.95
Dinero, Colo	....	....
Golden Era, Mont	.01	.02½
Golden King	....	....
Gold Run	....	....
Golden West	....	.07
Granite Mountain, Mont.	44.75	45.50
Hope, Mont	....	....
Ingram	.55	....
Iron Clad	.10	....
Ivanhoe, Colo	....	....
L. X. L. Colo	....	.05
Keystone	.02	.03
La Union	.10	.11
Little Albert	.60	1.25
Little Giant	....	....
Major Budd, Mont	.10	.11
Mexican Imp., Mex	.22½	.26¼
Michael Breen	.85	.90
Montrose Placer, Colo.	....	....
Mountain Key	.53¾	.56¼
Mountain Lion	.68½	.09½
Neath, Colo	.11	.13
Old Colony	....	....
Old Jesuit	....	....
Pat Murphy, Colo	.09½	.10½
Pedro	.01	.02
Phillips, Colo	....	....
Pine Grove, Idaho	.02½	.03
Queen of the West, Idaho	....	.03
Raspberry, Mont	....	....
San Francisco, Mont	.01	.01½
Silver Age, Colo	1.00	1.45
Silver Bell	....	....
Small Hopes, Colo	.90	....
Tourtelotte, Colo	.05	.05½
West Granite, Mont	1.10	1.20
Wire Patch	.14½	.16¼
Yuma, Ariz	.55	.65

Trust Stocks. May 23.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.	
American Cotton Oil. Tr	$32¾@$33¼
Cattle Trust	12 @ 15
Distillers' & Cattle Feeders'.	43¾@ 44
Linseed Oil	54 @ 55
National Lead	22½@ 22⅝
Natural Gas	@
Standard Oil	169 @171
Sugar Refineries	90½@ 90⅝

Sales at the New York Stock Exchange week ending May 23:

	Sales.	Price H.	Price L.
*American Cotton Oil	22,430	34½	32½
National Lead	78,671	24⅛	22½
Sugar	376,440	95	87¼

*Trust receipts.

Foreign Quotations.

London.

COMPANY.	Highest.	Lowest.
Almada, Mex	2s.	1s. 6d
Amador, Cal	11s. 9d.	11s. 3d.
Appalachian, N. C	9d.	6d.
Canadian Phos. Canada.	£1¼	£1¼
Carlisle, N. Mex	3s 6d.	3s.
Colorado, Colo	4s. 9d.	4s. 3d.
Comstock, Utah	....	....
Condova	....	....
Cons. Esmeralda, Nev.	2s. 9d.	2s. 3d.
Denver Gold, Colo	1s.	6d.
Dickens Custer, Idaho.	1s. 6d.	1s.
East Arevalo, Idaho.	2s.	1s.
Eberhardt, Nev	....	....
El Callao, Venezuela	....	....
Elmore, Idaho	2s. 6d.	2s.
Empire, Mont	1s. 3d.	9d.
Garfield, Nev	3s 6d.	2s. 6d.
Jay Hawk Mont	3s.	2s.
Josephine, Cal	4s.	2s.
Kohinoor, Colo	2s.3d.	1s. 9d.
La Luz, Mex	1s.	6d.
La Valera, Mexico	22s. 6d.	17s. 6d.
Montana Lt., Mont	£2 5-6	£2 4-6
New California, Colo	9s. 3d.	8s. 9d.
New Consolidated	9d.	3d.
New Eberhardt, Nev	1s. 6d.	1s.
New Emma, S., Utah	2s. 3d.	1s. 9d.
New Flagstaff, Utah	1s. 9d.	1s. 3d.
Newfoundland, N. F	3s.	2s. 6d.
N. Gold Hill, N. C	1s	6d.
New Guston, Colo	£2 3-16	£2 15-16
New Hoover Hill, N. C.	1s. 6d.	1s.
Old Lout, Colo	£13-16	£11-16
Palmarejo, Mex	17s	16s.
Pinos Altos, Mex	14s. 6d.	13s. 6d.
Pittsburg Cons., Nev.	1s. 9d.	1s. 3d.
Richmond Con., Nev	1⅝s.	1⅜s.
Ruby&Dunderberg,Nev	1s.	6d.
Sam Christan, N. C.	1s. 6d.	1s.
Sierra Buttes, Cal	5s.	4s.
" Plumas Eur	£15-16	£13-16
Sonora, Mex	1s.	6d.
Stanly, N. C	2s. 9d.	2s. 3d.
United Mexican, Mex	7s.	6s.
U. S. Placer, Colo	2s. 3d.	1s. 9d.
Viola Lt., Idaho	2s. 3d.	1s. 9d.

Highest and lowest prices during the week ending May 10.

Paris.

	Francs	Francs.
Beimez, Spain	742.50	742.50
Callao, Venez	61.25	31.25
Callao Bis, Venez	4.00	4.00
East Oregon, Ore	8.25	8.25
Forest Hill Divide, Cal.	150.00	150 00
Golden River, Cal	350.00	350.00
" " parts	35.00	35.00
Lexington, Mont	121.25	121.25
" parts	3.00	3.00
Ouray, Colo	....	....
Rio Tinto, Spain	435.00	435 00
Tharsis, Spain	140 00	140.00

Highest and lowest prices during the week ending May 8.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18°, ℔ 100 lbs 1.00@1.50
Muriatic, 20°, ℔ 100 lbs 1.12½@1.75
Muriatic, 22° ℔ 100 lbs 1.37½@2.00
Nitric, 36°, ℔ 100 lbs 4.00@4.25
Nitric, 42°, ℔ 100 lbs 6.00@6.25
Oxalic, ℔ 100 lbs 6.50@10.50
Sulphuric, 60°, ℔ 100 lbs. 80@1.25
Sulphuric, 66°, ℔ 100 lbs 1.00@1.75

Alkali—
Refined, 48 p. c @2¾
Refined, 58° 2¾@3
Alum—Lump, ℔ lb 1¾
Ground, ℔ lb 1¾@2
Lump. ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10
Aqua Ammonia—18°, ℔ lb 4¾
20°, ℔ lb 6
22°, ℔ lb 6@7
26°, ℔ lb 10@11
Ammonia—Sul., ℔ 100 lbs 3.15
Carb., per lb 7½@8½
Arsenic—White, powdered, ℔ lb. 3¼@3½
Red, ℔ lb 5¼@6¾
White, at Plymouth, ℔ ton £12 2 6d.
Asbestos—Am., p. ton $50@$300
Italian, p. ton, c. i. f. L'pool £18@£60
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb 4½@5½c
Hard Cuban, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00
Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.50
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1, casks, Runcorn " £4 10 0
No 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb 2@2½
Borax—Refined, ℔ lb. 9½@9⅝
Concentrated 7¾@8⅜
Refined at Liverpool, ℔ ton £29
Brimstone—*See Sulphur.*
Bromine—℔ lb 37@38
Chalk—℔ ton 1.75
Precipitated, ℔ lb. 4¾@5
China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50
Chrome Yellow—℔ lb 10@25
Cobalt—Oxide, ℔ lb 2.60@2.90
Copper—Sulph. English Wks, ton £20@£21
Copperas—Common, ℔ 100 lbs 70
Best, ℔ 100 lbs 75@1.00
Liverpool, ℔ ton, in casks £1 15s.
Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c 23
Emery—Grain, ℔ lb 4½@5
Flour, ℔ lb 2¾@3½
Feldspar—Ground, ℔ ton 15.00
Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb 1¾@2
Gypsum—Calcined, ℔ bbl. 1.25@1.50
Iodine—Resublimed 2.75
Kainit—℔ ton $9.25@$9.75
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb 6¾@7¼
White, English, ℔ lb 8½@8¾
Acetate, or sugar of, white 12@13
Lime Acetate—Amer. Brown. .95@1.00
" Gray 1.75@1.87½
Litharge—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb 9@9½
Magnesite—Greek, ℔ ton 20.00
Manganese—Crude, per unit .23@.28
Oxide, ground, per lb 2¾@6½
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb. 70@72
Mineral Wool—℔ lb 2
Mica—In sheets according to size, 1st quality, ℔ lb .25@$6.00
Ochre—Yellow, "B. F.," ℔ ton, f.o.b. mill 30.00
"J. F. L. S.," ℔ lb, ex dock 2½
Phosphate Rock—S. Carolina, per ton f. o. b. Charleston. 5.75@7.00
Ground, ex vessel New York. 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00
Phosphorus—℔ lb 70@75
Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb 5@7
Potassium—Cyanide, ℔ lb. .39@40
Bromide, ℔ lb 33
Chlorate, ℔ lb. 13@10
Carb. ℔ lb. 4.70@5.54
Caustic, ℔ lb 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs 1.77½@1.80
Nitrate, refined, ℔ lb 6@8
Bichromate, ℔ lb 10½@11
Sulphate, ℔ 100 lbs. 2.30@2.35
Yellow Prussiate, ℔ lb. 17½@18
Red Prussiate, ℔ lb. 42@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d
Quartz—Ground, ℔ ton. 14.00@16.00
Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb 6@10
Salt—Liverpool, ground ℔ sack. 75@80
Turk's Island, ℔ bush 25@28
Salt Cake—℔ lb 60@62½
Saltpeter—Crude, ℔ lb. 5¼@5¾
Refined, ℔ lb 6@8
Soda Ash—Carb., 48 % 100 lbs. 2¾
Caustic, 48 % 2¼@2½
Soda Caustic, 60% 3.25@3.35
" 70% 3.00
" 74-76% 2¾
Sal, English, ℔ 100 lbs. 1½@1¾
Sal, American, ℔ 100 lbs .90
Nitrate, 100 lbs 1.70
Strontium—Nitrate ℔ lb. 9@9½
Sulphur—Roll, ℔ lb 1¾
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton. 19.00@19.25
Crude Brimstone, 3ds, ℔ ton. 18.50@18.75
Talc—Ground French, ℔ lb 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5
Vermillion—American, ℔ lb. 61
English, ℔ lb. 82@85
Vitriol—(Blue), Ordinary, ℔ lb. 5½@5⅝
Extra, ℔ lb. 7
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb. 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), ℔ lb. $2.@$2.50
Sheet, per lb. 2.50
Arsenic—(Metallic), per lb. .40
Barium—(Metallic), per gram $4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1.00
Calcium—(Metallic), per gram 10.00
Cerium—(Metallic), per gram 7.50
Chromium—(Metallic), per gram 1.00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram 9.00
Erbium—(Metallic), per gram 7.50
Gallium—(Metallic), per gram 140.00
Glucinum—(Metallic) per gram. 12.00
Indium—(Metallic), per gram 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 13.00
Lithium—(Metallic), per gram 10.00
Magnesium—Per lb 4.50
Manganese—Metallic, per lb. 1.10
Chem. pure, per oz. 10.00
Molybdenum—(Metallic), per gm. .50
Niobium—(Metallic), per gram 5.00
Osmium—(Metallic), per oz 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 9.00
Potassium—Metallic, per lb. 28.00
Rhodium—(Metallic), per gram, 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic) per lb. 2.50
Strontium—(Metallic), per gm. .60
Tantallum—(Metallic) per gram 9.00
Telurium—(Metallic) per lb. 5.00
Thallium—(Metallic) per gram. .25
Titanium—(Metallic) per gram. 2.25
Thorium—(Metallic) per gram 17.00
Tungsten—(Metallic) per oz. 2.25
Uranium—(Metallic), per lb. 5.00
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram 9.00
Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000 3.50@3.75
Jerseys, ℔ 1,000 5.50@7.00
Up Rivers, ℔ 1000 6.75@7.00
Haverstraw seconds, ℔ 1000 6.50@7.00
Haverstraw firsts, ℔ 1,000 7.00@7.75
Fronts, nominal, ℔ 1000.
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore
Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu. ft. 45@1.25
Granite, Scotch ℔ cu. ft. 1.00@1.15
Cement—Rosendale, ℔ bbl .85@1.10
Portland, American, ℔ bbl. 2.15@2.45
Portland, foreign, ℔ bbl. 2.30@2.40
Portland, " special brands. 2.45@2.75
Roman, ℔ bbl. 2.65@2.85
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.00@8.25
Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black, roofing, ℔ 100 sq. ft. 4.25@5.50
Lime—Rockland, common ℔ bbl. .1.00
Rockland, finishing, ℔ bbl. 1.20
St. John, com. and finish, ℔ bbl. .90@.95
Glens Falls, com. and fin., ℔ bbl .85@1.10
Labor—Ordinary, ℔ day 1.50@2.00
Masons, ℔ day 4.00
Plasterers, ℔ day 4.00
Carpenters, ℔ day 3.50
Plumbers, ℔ day 3.50
Painters, ℔ day 2.50@3.50
Stonesetters, ℔ day 3.50@4.00
Tilelayers, ℔ day 3.50@4.50
Bricklayers, ℔ day 4 00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.